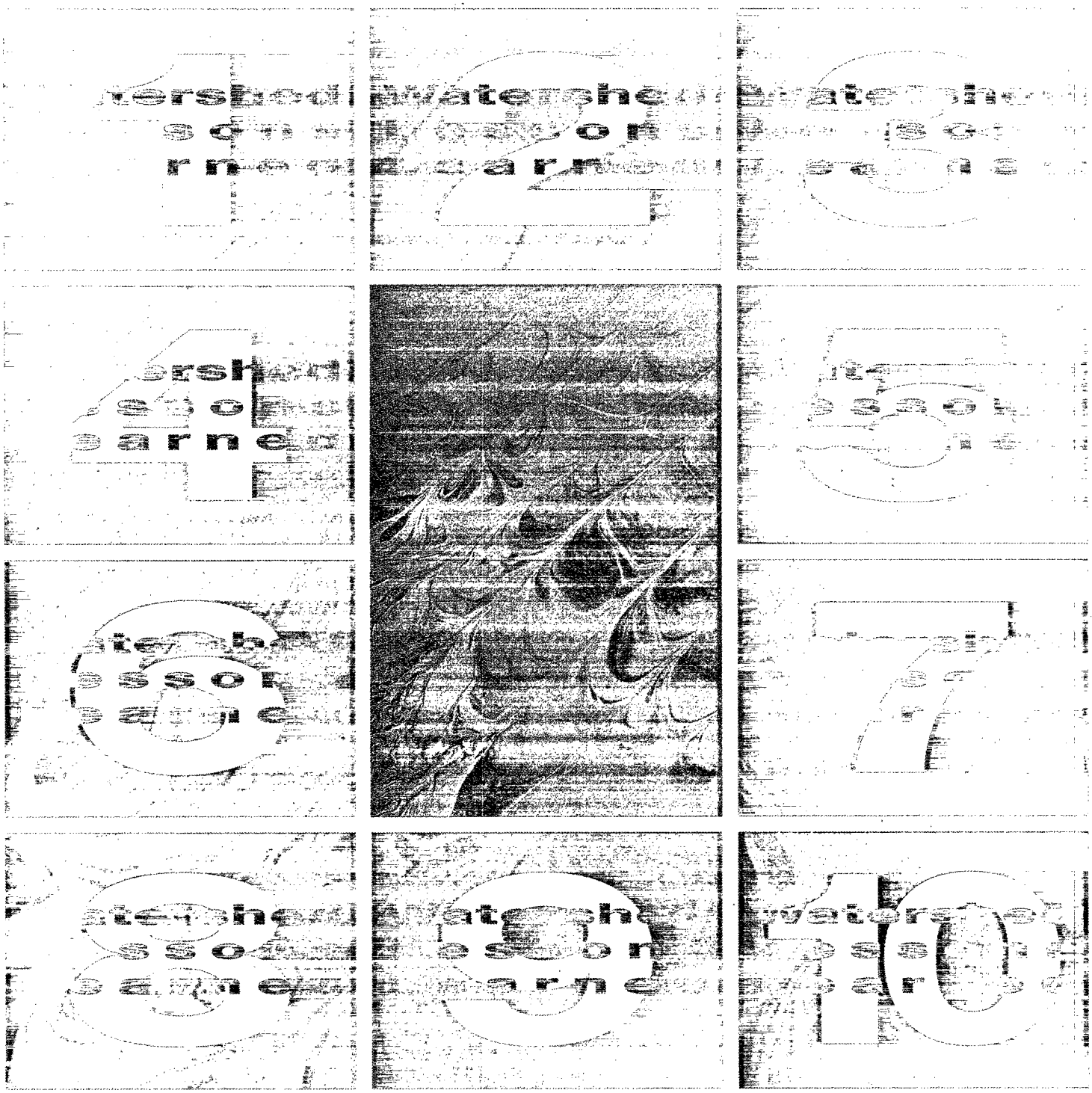
United States
Environmental Protection
Agency

Office of Water, Office of Wetlands,
Oceans, and Watersheds
(4501F)

EPA840-F-97-001
October 1997

EPA

Top 10 Watershed Lessons Learned



Watershed Lessons Learned

PARTNERS

Developed In Partnership With Over 100 Watershed Practitioners And Their Supporters, Including:

Adams County Conservation District, Pennsylvania

Adopt-A-Watershed, California

American Rivers, Washington, D.C.

Anacostia Watershed Society, Washington, D.C.

Brazos River Authority, Texas

California Coastal Conservancy

California Regional Water Quality Control Board - San Diego

Cedar River Watershed, Washington State

Center for Watershed Protection, Maryland

Cheat River Watershed, West Virginia

Crystal Lake Watershed, Michigan

East Bay Municipal Utility District, California

Farm-A-Syst, Wisconsin

Global Rivers Environmental Education Network, Michigan

International City County Management Association, Washington, D.C.

Know Your Watershed, Indiana

Lake Pontchartrain Foundation, Louisiana

Lower South Platte River Natural Resource District, Nebraska

Maryland Department of Natural Resources

Maryland Office of Planning

Massachusetts Watershed Coalition

McKenzie Watershed, Oregon

Montana State University

Napa County Resource Conservation District, California

Nashua River Watershed, Massachusetts

National Association of Conservation Districts

National Association of Counties, Washington, D.C.

National Center for Heritage Development, Maryland

National Conference of State Legislatures, Colorado

National Council of Farmer Cooperatives

National Environmental Education and Training Foundation, Washington, D.C.

National Fish and Wildlife Foundation, Washington, D.C.

Natural Resource Conservation Service

Ohio State University Cooperative Extension Service

Oklahoma Conservation Commission

Puget Sound Water Quality Action Team, Washington State

River Network, Washington, D.C. and Portland, Oregon

San Jose Watershed, California

Santa Ynez Watershed, California

Save Our Streams - Izaak Walton League

State Conservation, Water Quality and Natural Resource Agencies

Tampa Bay National Estuary Program, Florida

Tennessee Valley Authority

Tensas River Watershed, Louisiana

Terrene Institute, Virginia

University of Colorado Natural Resources Law Center

University of Connecticut Cooperative Extension Service

University of Nebraska Cooperative Extension Service

University of Wisconsin Cooperative Extension Service

Urban Land Institute, Washington, D.C.

Upper Arkansas Watershed Council, Colorado

U.S. EPA Regions 1, 2, 3, 5, 6, 7, 8, 9

West Virginia Division of Environmental Protection

...and many others

Project Coordinator: Ben Ficks,
U.S. EPA Office of Wetlands, Oceans, and Watersheds
401 M Street, S.W. 4501F
Washington, D.C. 20460
202-260-8652, 202-260-2529(fax)
ficks.ben@epamail.epa.gov

Editor: Leighton Price,
Independent Consultant, Annapolis, MD

Design: Global Exchange, Inc.
Bethesda, MD

For additional copies of this document, please call the National Center for Environmental Publications and Information, 1-800-490-9198.

This document has been subject to the Agency's review, and it has been approved for publication as an EPA document. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Watershed Lessons Learned
COMMENTS

Developed with Partners Across the Nation

"A very helpful document and is the kind of EPA publication that would be most helpful for us."

— Fran Rudoff, Sustainable Regions Coordinator, Maine State Planning Office

"Fantastic. This is...a really useful and insightful document, with practical advice and clear examples."

—Douglas Kenney, University of Colorado - Boulder, Natural Resources Law Center

"Excellent resource guide for all watershed programs."

—Bob Adler, University of Utah College of Law, Salt Lake City, Utah

"Full of information."

— Jill Davies, Adopt-A-Stream Project, Elk Creek Watershed, Montana

"A good resource for initiating watershed work. I am planning on contacting some of the project contacts whom I have not met yet."

—Tom Conry, Brazos River Authority, Texas

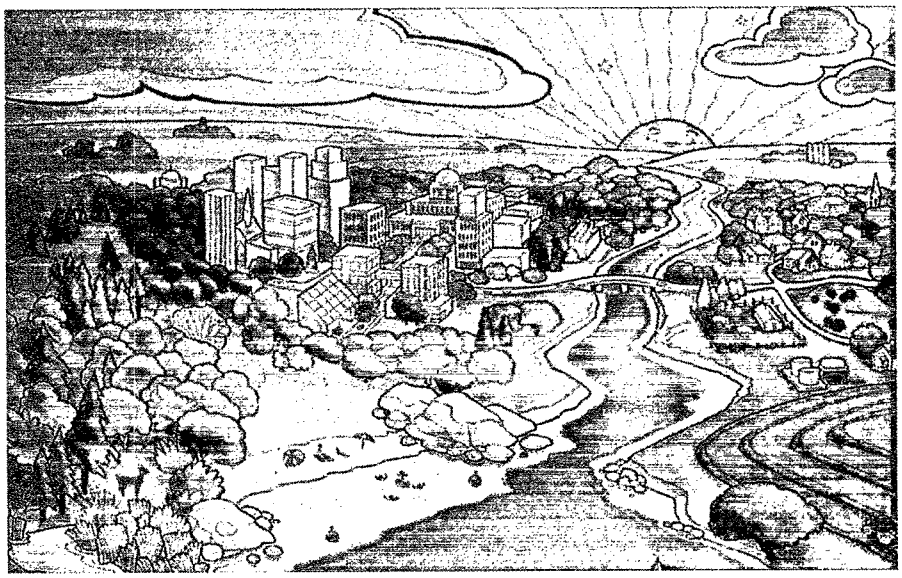
"Good information. Good referrals."

—Robert Levite, Nashua River Watershed Association Land Protection Director

CONTENTS

INTRO

For the past six or so years, EPA, in partnership with many others, has been pursuing a watershed approach* to protecting our lakes, rivers, wetlands, estuaries, and streams. For a federal agency with a strong regulatory tradition, this is a new way of doing business. Taking on the role of community helper and partner has been a challenge. As with any change of this magnitude, there has been a lot of trial and error, and important lessons have been learned by us, and our many partners, that are worth sharing. Oftentimes, these lessons have been shared informally through networking at conferences, by phone, or over the internet. This series of Watershed Lessons Learned is an attempt to identify the top lessons and present them in one place.



Nonpoint source pollution is a major problem in watersheds across the United States. SPLASH is an interactive tool that educates people about what steps they can take to address this problem. *Credit: Provided by Diana Allen*

The target audience for this publication is what I call "watershed practitioners and those who support them." By this, I mean anyone who is trying to make watershed work happen or support it, including concerned citizens, scientists, government employees (on the local, state and federal levels), corporate sponsors, nonprofit groups, among others. The publication of these lessons is timely given our celebration of 25 years of progress associated with the Clean Water Act. This publication addresses the next generation of protection: working by watersheds.

We believe this document meets two real needs. First, it will help readers learn what works and what does not based on past experience. Second, it will assist people in reaching important resources and contacts that exist across the nation that can help them. The need for such information was pointed out in the conclusion of a presentation made by Robert Nuzum, Manager of Natural Resources, at East Bay Municipal Utility District in Oakland, CA.

After working on a watershed plan for four years, he said that if he had to do it over again, he would spend more time educating participants on "what works" and "what doesn't" prior to beginning his watershed planning effort.

As for how this product was developed, a focus group comprised of 20 members of the target audience was assembled. This included representatives from River Network, Know Your Watershed, Center for Watershed Protection, Maryland Office of Planning, EPA Regional Offices, among others. This group reacted to the idea, refined it, and developed the "top 10" watershed lessons learned. That list was circulated and improved with the insights of approximately 100 watershed coordinators and their supporters across the nation. These practitioners helped to identify the best examples to illustrate each lesson and the resources that have worked for them. Such testimony is very powerful.

In terms of using this piece, each lesson is stand-alone and contains a short description of the lesson, a few examples to illustrate it (with a contact where more

information can be obtained) and a list of key contacts and resources associated with the lesson. In addition, we have included in the appendix indices to help guide you - the reader - through the information. This includes answers to commonly asked questions - the ones that we heard over and over again as we developed this piece.

So, if you are pressed for time, we suggest you begin there.

In addition, this document is up on our fully searchable web site at http://www.epa.gov/owow/lessons if you prefer to see and explore information that way.

EPA wishes to thank the many reviewers and contributors to this piece. Their contributions were invaluable. It was very rewarding to have the opportunity to connect with so many experienced practitioners and to learn from them. In addition, the feedback on the first draft was quite positive, so we feel strongly that we are meeting a true need, and that is exciting. If you have feedback, please use the form provided in the back.

—Ben Ficks,
US EPA Watershed Outreach Coordinator

* Many EPA documents are available that define what we mean by "watershed approach." See **Watershed Approach Framework,** EPA 840-S-96-001, http://www.epa.gov/OWOW/watershed/framework.html or **Watershed Protection: A Statewide Approach** EPA 841-R-95-004, http://www.epa.gov/OWOW/watershed/state/ Call 1-800-490-9198 for a free copy.

Key Contacts and Resources

"LESSON LEARNED" RESOURCES
(Also See Appendix 1)

- **Top Ten Hint List** from Know Your Watershed is a very popular hint list for watershed coordinators and is based on extensive interviews with watershed coordinators across the nation. Conservation Technology Information Center, 1220 Potter Drive, Room 170, West Lafayette, IN 47906, 765-494-9555, 765-494-5969 (fax), kyw@ctic.purdue.edu, http://ctic.purdue.edu/KYW/KYW.html (See Appendix 1).
- **Lessons Learned: A Casebook for Successful Urban River Projects,** June 1997, American Rivers, Victor McMahan, Director, Urban Rivers Program, 1025 Vermont Avenue, N.W., Suite 720, Washington, D.C. 20005, 202-547-6900, 202-347-9240 (fax), amrivers@amrivers.org, http://www.amrivers.org/ Documents lessons learned by urban river project groups across the country and offers advice for others. Includes contact information for each project.
- **Innovations In Coastal Protection: Searching for Uncommon Solutions to Common Problems,** EPA 842-F-94-002, Call 1-800-490-9198 to order, http://www.epa.gov/OWOW/coastal/cookbook/, features innovative public outreach and education, management, and scientific approaches to protecting coastal resources and their watersheds. Indexed by author, keyword, and state.
- **Nonpoint Source Pollution Information/Education Programs: National Conference** Proceedings, October 22-24, 1996, includes over 30 papers many of which include lessons learned. Copies of proceedings can be obtained from Illinois Environmental Protection Agency, Division of Water Pollution Control - Planning Section, P.O. Box 19276, Springfield, Illinois 62794-9276, 271-782-3362, 217-785-1225 (fax).
- **Watershed Management - What Works and What Doesn't,** presentation by Robert Nuzum based on his 24 years of experience in watershed management. Robert Nuzum, Manager Natural Resources, East Bay Municipal Utility District, 375 Eleventh Street, Oakland, CA 94607-4240, 510-287-0407, nuzum@ebmud.com.
- **Merrimack River Initiative, Watershed Connections: Lessons Learned in Subwatersheds,** January 1996, 24+ page document. Contact Carolyn Jenkins, New England Interstate Water Pollution Control Commission, 255 Ballardvale Street, 2nd floor, Wilmington, MA 01887, 508-658-0500.

NATIONAL WATERSHED RESOURCES

- **Watershed '96 Conference Proceedings,** national conference where hundreds of papers were presented all of which are on-line and searchable, http://www.epa.gov/OWOW/watershed/Proceed/, many lessons learned are shared.
- **America's River Renaissance: Innovative Approaches to River Protection - Nine Success Stories.** A report by River Network, September, 1996. P.O. Box 8787, Portland, OR, 97207, 503-241-3506 (phone).

REGIONAL WATERSHED RESOURCES

- **Restoring Our Watersheds: An Assessment of River Stewardship in New England and New York,** Appalachian Mountain Club, Peter Donahue, 5 Joy Street, Boston, MA, 02108, 617-523-0636, 617-367-8878 (fax).
- **The Watershed Sourcebook: Watershed-Based Solutions to Natural Resource Problems,** University of Colorado School of Law, Natural Resources Law Center, Campus Box 401, Boulder, Colorado, 80309-0401, Doug Kenney, (303) 492-1288, (303) 492-1297 (fax), Douglas.Kenney@Colorado.EDU, concise case studies of 76 watershed initiatives in the western United States. Center is also examining the state and federal roles in supporting watershed groups.

Watershed Lessons Learned AT A GLANCE

The Best Plans Have Clear Visions, Goals, and Action Items.

Powerful visions make plans come alive and can stimulate action.

Good Leaders are Committed and Empower Others.

Watershed approaches take time and require dynamic leaders with strong interpersonal skills.

Having A Coordinator at the Watershed Level is Desirable.

A coordinator based in the watershed provides a focal point and helps build relationships and establish trust.

Environmental, Economic, and Social Goals are Compatible.

Watershed approaches are a way to make the concept of sustainability a reality on the ground.

Top 10 Watershed Lessons Learned At A Glance

www.epa.gov/owow/lessons

Plans Only Succeed if Implemented.

Successful plans - ones that do not collect dust - focus on a manageable scale and assign action items to individuals.

Partnerships Equal Power.

Rather than putting up fists, watershed groups are shaking hands with all stakeholders, including industry, to remedy the major problems.

Good Tools are Available.

Powerful tools such as workshops, guides, internet sites, and geographic information systems exist to support watershed groups.

Measure, Communicate, and Account for Progress.

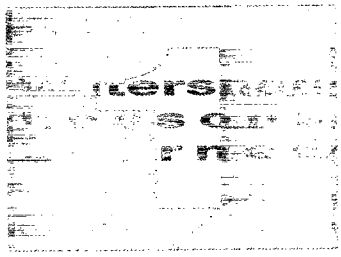
Delivering meaningful information to the public and key decision makers is critical so that they can monitor progress.

Education and Involvement Drive Action.

Well-designed education programs lead to tangible results when they involve people and encourage reflection.

Build on Small Successes.

Starting small and building incrementally creates momentum toward larger goals and visions.



The Best Plans Have Clear Visions, Goals, and Action Items

Visions can rally individuals to take action and to focus their efforts on specific goals. The best visions are graphic in their descriptions and relate to human experience. Bernie Fowler, for example, former Maryland state senator and a leading voice on environmental issues, brought instant attention to the problem of sediment in the Patuxent River when he stood chest high in the river and declared: "I want to be able to see my feet." At the very least, visions must be scientifically accurate — represent the facts — and be understandable to the general public.

So how does a watershed group come up with powerful visions? Experience suggests that before a group can develop visions and goals, there must be a clear and widely recognized problem statement. This statement helps to establish a common understanding of the conditions that warrant a watershed protection effort. The term "problem" does not mean that a water body has to be actually damaged before action can be taken. Just the threat of damage in a pristine watershed may prompt a group to take action.

Clear visions help watershed groups understand, relate to, and support protection and restoration efforts. And, when framed well, they can also help the general public, elected officials, business, the press, and community leaders understand.

In addition to visions, groups usually develop goals, objectives, and action items. The difference among them is as follows.

A. Visions - general statements of where the effort wants to go and what it will accomplish over a given time span (usually 5 to 10+ years). Visions should be comprehensive enough to capture the thrust of the efforts overall mission.

B. Goals - less general than visions, describe what is needed to obtain vision, refer to components of overall effort, sometimes quantifiable.

C. Objectives - elaboration of goals, describe types of management or activities and are quantifiable where possible.*

D. Action Items - explain who is going to do what, where, and when; they generally articulate how to implement the objectives and should be quantified if possible; benchmarks of existing conditions and/or indicators should be developed for action items.

*Note: Objectives are optional. Some watershed groups may find that additional level of detail confusing.

These four elements are folded into an implementation plan. It is desirable to obtain commitments to as many of them as possible.

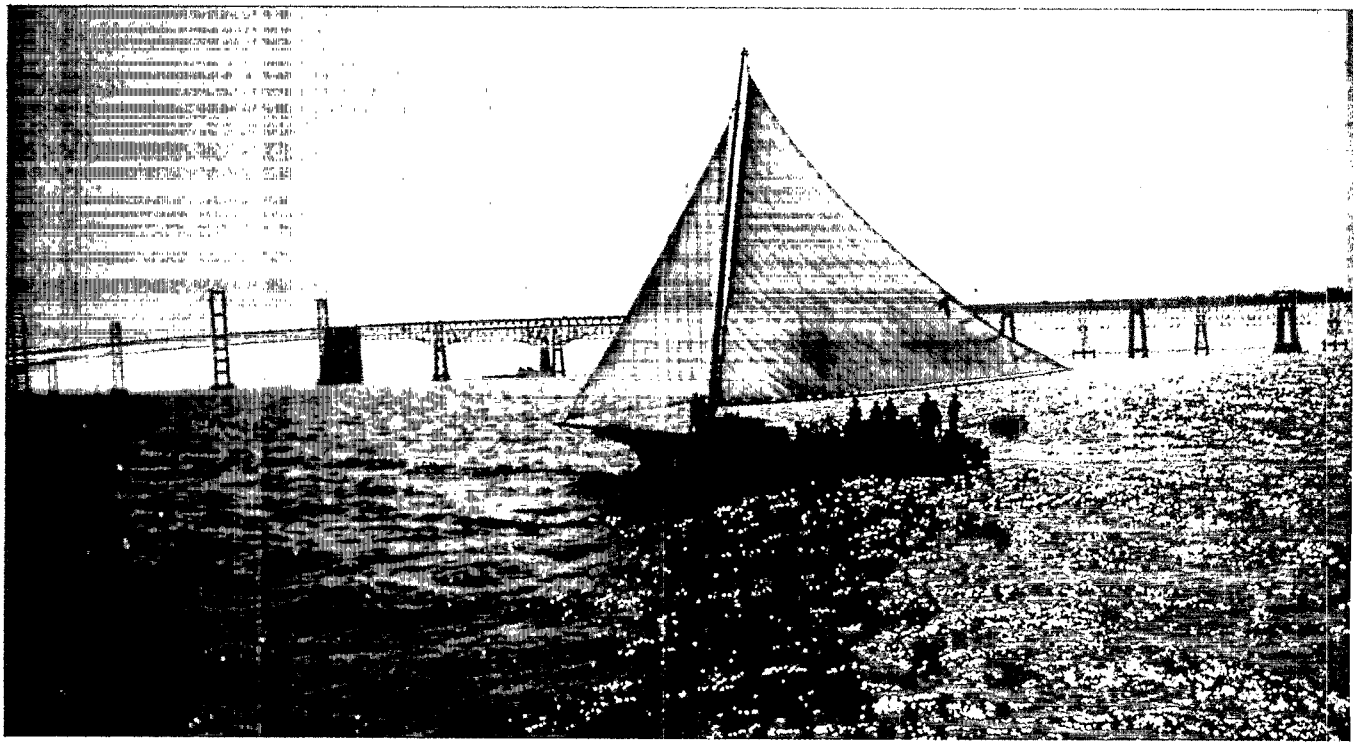
Many watershed groups go through a facilitated workshop process in which they develop their statements. A facilitator, as a neutral party, can help people reach consensus and avoid getting bogged down in arguing among interests. It is important not to quibble over whether a particular statement becomes a goal or an objective. What is important is to get issues on the table. Designating them can come later. The below examples illustrate some lessons learned in different regions across the nation.

Chesapeake Bay Watershed

The 40 Percent Nutrient Reduction Goal Was Perceived as Fair

The sum of these options results in a 40 percent nutrient reduction for each bay tributary.

In the 1970's, it became increasingly obvious that the Chesapeake Bay was degraded. Bay grasses had died back to a fraction of their historical coverage, large parts of the bay were devoid of oxygen, the water was murky, and some species of fish and shellfish had dramatically declined. An extensive series of scientific studies was undertaken to determine the causes of the problem. By the early 1980's, a scientific consensus emerged that nutrients — both



Boaters enjoy a cleaner Chesapeake Bay thanks to efforts across the multistate watershed. *Credit: Steve Delaney, EPA.*

nitrogen and phosphorus — were the primary pollution problem in the Bay. Moreover, it was clear that states throughout the Bay's 64,000 square mile watershed were contributing to the pollution problem. In 1983, the first Chesapeake Bay Agreement was signed by the Governors of Maryland, Virginia, and Pennsylvania, the District of Columbia, the Chesapeake Bay Commission (representing the legislative bodies of those states), and the U.S. Environmental Protection Agency. This Agreement represented a vision of creating a regional approach "to improve and protect water quality and living resources of the Chesapeake Bay estuarine system."

In 1987, the second Chesapeake Bay Agreement was signed, which affirmed the regional watershed approach adopted in 1983, and included specific goals to restore water quality. Among the most important was the goal to: "develop, adopt, and begin implementation of a basin-wide strategy to equitably achieve by the year 2000 at least a 40 percent reduction of nitrogen and phosphorus entering the main stem of the Chesapeake Bay. The strategy should be based on agreed-upon 1985 point source loads and on nonpoint loads in an average rainfall year."

A subsequent agreement specified this load in pounds of nitrogen and phosphorus, and allocated it to the Bay jurisdictions. This goal is notable for several reasons:

- It is based on a scientific consensus of perhaps the most well-studied ecosystem in the world;
- The 40 percent reduction is the key to restoring the Bay but is also linked to many other goals;
- It can be communicated to and understood by the general public, elected officials, and others;
- It is specific, quantifiable and can be allocated to particular political jurisdictions or river basins;
- It is perceived as fair, yet flexible. In order to reach the Bay-wide 40 percent nutrient reduction goal, each jurisdiction was assigned a 40 percent nutrient reduction goal. Yet each jurisdiction was free to develop its own strategy to meet that goal, based on local land uses, existing programs, and resources.
- It has the political support of the leaders of the Bay States and the U.S. EPA, as well as the broad support of local governments, the public, and an array of interest groups.

The goals objectives include implementing the conservation practices needed to achieve the 40 percent nutrient reduction goal. This is being done through the development of Tributary Strategies — watershed-based plans to reduce nutrient pollution through wastewater treatment plants, agricultural best management practices, and resource protection, and growth management activities. The sum of these options results in a 40 percent nutrient reduction for each bay tributary.

The evolution of the Chesapeake Bay Agreement illustrates the progression from a common vision to a specific goal that is implemented through a series of specific actions. In the Bay watershed, the emphasis has evolved from an initial focus on the main stem of the Bay to the actions taken by individuals and local governments throughout the watershed. Other Bay goals have been established, including those for acres of submerged aquatic vegetation, number of

fish passages, and miles of riparian forest. The community is still working on addressing goals associated with growth management, local government involvement, and freshwater streams.

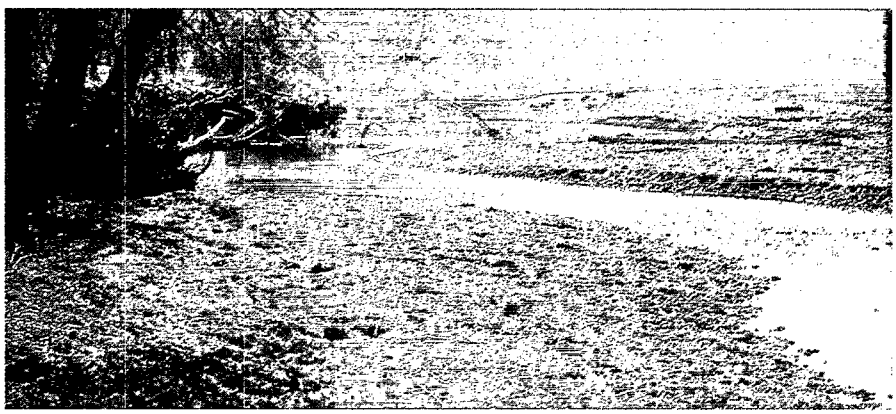
For more information:
contact Rich Hall, Maryland Office of Planning, 410-767-4560, 410-225-4480 (fax), Rich@mail.mop.md.gov or Lauren Wenzel, Maryland Department of Natural Resources, LWENZEL@dnr.state.md.us, 410-974-2784, 410-974-2833 (fax).

The State of Oklahoma

Where *Visions* Must be Embraced by Locals

The locals were more interested in water for livestock, while the state was more interested in good water quality.

For the Illinois River in Oklahoma, the Oklahoma State Conservation Commission (Soil and Water Conservation Agency), "the Commission," which has the legislative authority for nonpoint source issues, came up with a vision that was not embraced at the local level. At the beginning of their efforts in the Peacheater Creek Watershed demonstration project, the State went to the local community and described for them the impression they had of water quality problems in the creek: nutrients, cattle in the stream, and animal waste. They found, however, that when they went out to view the stream with the landowners, the stream appeared clear; only the reservoir way downstream showed the effects of excessive nutrient loads. The locals were more interested in water for livestock, while the state was more interested in good water quality.



Agricultural nonpoint source pollution has impacted stream banks along stretches such as this one in Oklahoma. *Credit: Provided by John Hassell, Oklahoma Conservation Commission.*

The Commission was able to engage local landowners only when they questioned what the stream was like when the landowners were growing up. Together, they discovered that the stream had been deep and had contained a lot of fish. This contrasted with its present state: wide and shallow with few fish. After establishing the difference, the community was able to isolate the reason for the change: removal of riparian vegetation, cattle in the stream, and stream bank erosion.

The Commission learned lessons that it will apply in future efforts in the Peacheater Creek Watershed and when it undertakes another watershed project:

- First, they will identify local people who care to lead a watershed restoration project. If none can be found, then their energy is better spent in watersheds where there is local interest.
- Second, they will ask the landowners to identify the problems (the first step in developing a vision). The State will limit its role to offering technical, education, and financial assistance.
- Third, the State will not take on the role of facilitator/moderator at the meetings.

- **Finally, the State will be careful not to overwhelm citizens with large numbers of bureaucrats. At one night meeting, the State outnumbered landowners 2:1. Needless to say, there was a sense that taxpayer money was going to waste.**

For more information:
contact, John A. Hassell, Director, Water Quality Programs, Oklahoma Conservation Commission, 413 NW 12th St., Oklahoma City, OK 73103-3706, 405-979-2204, 405-979-2212 (fax), jhassell@occwq.state.ok.us

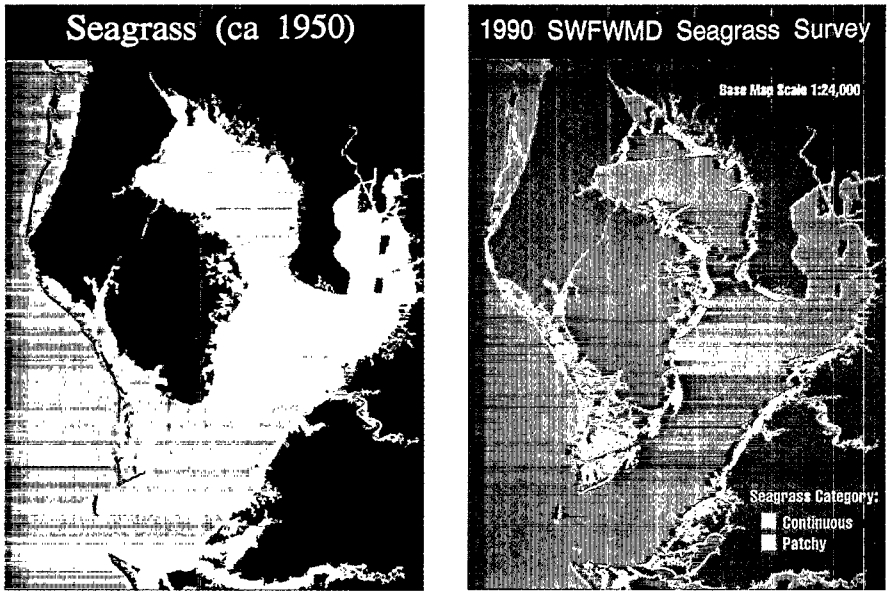
Lesson from the Tampa Bay National Estuary Program

Citizens Relate to Sea Grasses

Charting the Course, the National Estuary Program's (NEP) Comprehensive Conservation and Management Plan for Tampa Bay, stresses measurable, resource-based goals that are realistic and achievable. A key goal of the plan is to cap nitrogen loadings at current levels (1992 to 1994 average) to enable the continued recovery of sea grasses, which are important nursery and feeding areas for fish and other marine life. Sea grasses have become a driving force in the bay restoration blueprint because of their importance to the ecosystem. In addition, most citizens can relate to this tangible, resource-based goal.

Since the 1950's, Tampa Bay has lost about 15,000 acres of sea grasses due to excess nutrients, which have fueled the growth of algae and limited the amount of light reaching underwater grass beds. Water quality in Tampa Bay has improved significantly since the 1970's, largely due to improvements in wastewater treatment which have reduced the flow of nitrogen to the bay. Studies by the NEP indicate that an additional 12,000 acres of sea grass can be recovered by preventing future increases in nitrogen loadings. Achieving that goal will require local communities and industries to offset their nitrogen loadings by about 17 tons each year to compensate for anticipated nitrogen increases from growth.

Local governments have agreed to reduce their future loadings by 6 tons per year, that portion of the load attributed to municipal storm water runoff and sewage treatment plants. The remaining reductions will be addressed by a Nitrogen Management Consortium made up of the NEP's local government and agency partners, working with local electric utilities and agricultural and phosphate shipping interests. Instead of allocating specific reductions to each party, the Consortium is working to identify individual or group projects that would achieve the reductions. This innovative approach will help identify the most cost-effective and environmentally beneficial projects.



The dramatic decline in the amount of sea grass beds from the 1950's to the 1990's is a powerful rallying force for the need for a concerted approach to protect the Tampa Bay estuary.
Credit: Provided by the Tampa Bay National Estuary Program

For more information:
contact Holly Greening, National Estuary Program, 813-893-2765, 813-893-2767 (fax).

Key Contacts and Resources

GUIDES FOR PLANNING AND VISIONING

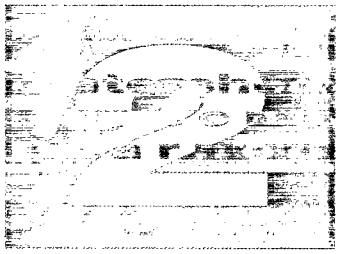
- **Building a Local Watershed Partnership** and **Putting Together a Watershed Plan,** Know Your Watershed. Describes step-by-step process for developing consensus around the purpose statement, measurable goals and objectives, and action items. Conservation Technology Information Center, 1220 Potter Drive, Room 170, West Lafayette, IN 47906, 765-494-9555, 765-494-5969 (fax), kyw@ctic.purdue.edu, http://ctic.purdue.edu/KYW/KYW.html
- **Casco Bay Plan,** Chapter 11: Developing the Casco Bay Plan describes the process used to set priorities and develop the plan. Regarded by many as a successful process that made use of focus groups and newspaper inserts. Contact: Katherine Groves, Casco Bay Estuary Project, 246 Deering Avenue, Portland, ME, 04102, 207-780-4820, 207-780-4913 (fax), kgroves@usm.maine.edu
- **Sourcebook for Watershed Education,** provides details on creating or enhancing programmatic support for watershed education and problem solving. It includes information on developing program vision and goals, obtaining community support and participation, program review and assessment, and sharing your story with others. Global Rivers Environmental Education Network, 206 South Fifth Avenue, Suite 150, Ann Arbor, MI 48104, http://www.econet.apc.org/green/ 313-761-8142
- **Riverwork Book: A Step-By-Step Guide for Citizens and Communities Developing River Planning and Conservation Efforts,** U.S. Department of Interior/National Park Service, P.O. Box 37127, Room 3606, Washington, D.C. 20013-7127, 202-565-1200, 96 pages. Produced in 1988 (may be updating but still useful). Contacts: Charly Stockman or Jennifer Pitt.
- **Community Visioning,** video, 2 hours, 1994, $94.95; APA members $89.95. Planners Book Service, 122 S. Michigan Ave., Suite 1600, Chicago, IL 60603, 312-786-6344, 312-431-9985 (fax), web address: http://www.planning.org/books/bookstor.html

EXAMPLES OF GOALS AND VISIONS

- **Water Works: Your Neighbors Share Ideas on Working in Partnership for Clean Water,** Tennessee Valley Authority, March 1997. Useful guide. Stories of Daryl Lawon and Shirely Blackwell discuss vision and goals. Kathleen O'Brien, editor, 423-632-8502, 423-632-3188 (fax).
- **Reducing Agricultural Pesticide Use in Sweden,** Journal of Soil and Water Conservation, November-December 1990, Volume 45, Number 6, describes Sweden's goal to cut pesticide use on farms by 50 percent. Contact: Anne Weinberg, US EPA, 401 M St., S.W. 4503F, Washington, D.C. 20460, 202-260-7107 weinberg.anne@epamail.epa.gov
- **The Visioning Process and Its Role in Consensus-Building,** Richard Volk, Program Director, Corpus Christi Bay National Estuary Program, Corpus Christi, TX, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/volk.html
- **EPA Region 3 Chesapeake Bay Program Website,** http://www.epa.gov/r3chespk/, EPA BAY PROGRAM WEBSITE
  Patuxent River Tributary Strategy, http://www.gacc.com/dnr/Bay/patuxent.html
- **1995-2020 Vision for the Nashua River Watershed,** Nashua River Watershed Association, 592 Main Street, Groton, MA 01450, December 1995, 508-448-0299, 508-448-0941 (fax). Nice example of a locally-developed watershed plan with three clear goals and discrete action items.
- **Diverse Partners with One Vision: The Bear Creek Watershed Restoration Plan** Carol C. Chandler, Biologist, L. Michelle Beasley, Economist, USDA, Natural Resources Conservation Service, Gallatin, TN paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/chandler.html
- **Moving the Watershed Planning Process from Quagmire to Success,** B. Fritts Golden, Vice President & Senior Environmental Planner, CH2M HILL, Oakland, CA, John W. Rogers, Senior Vice President & Senior Environmental Planner, CH2M HILL, Philadelphia, PA, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/golden.html
- **Maryland's Tributary Strategies: Statewide Nutrient Reduction Through a Watershed Approach,** Lauren Wenzel, Roger Banting, and Danielle Lucid, Maryland Department of Natural Resources, Annapolis, MD, paper presented at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/wenzel.html

NATIONAL PERSPECTIVE

- **Water Quality Goals and Indicators - Draft February 15, 1996,** Elizabeth Fellows, Mary Belefski, Sarah Lehmann, US EPA, Washington, D.C., Andy Robertson, NOAA, Washington, D.C. paper delivered at Watershed '96, http://www.epa.gov/OWOW/watershed/Proceed/fellows.html
- **The Keystone National Policy Dialogue on Ecosystem Management, Final Report, October 1996,** result of a dialogue among 50 high ranking representatives from various levels of government, the private sector and important stakeholder interests. Lists the key aspects of making ecosystem protection happen. Includes Regional examples. Keystone Center, CO, P.O. Box 8606, Keystone, CO 80435-7998, 970-468-5822.



Good Leaders are Committed and Empower Others

Leadership is a critical factor in making the watershed approach work. Watersheds can be large or small, urban or rural, degraded or pristine. They can have resources of local or national importance, and they can have little or great development pressure on them. Government may be trusted and relied upon or distrusted and feared. Likewise, the leader that emerges in any given watershed varies. He or she can be a farmer or rancher, coal miner, nonprofit organization member, local council person, or a government person from the state, tribal or federal level. Or, leadership can come in the form of a group or entity, such as a local board, State agency, or the Federal government. Essentially, leaders are individuals or groups who care about the watershed and its future.

As for common characteristics of successful watershed leaders, they tend to reflect the values of the community and to know what works there. They generally are good communicators, have the ability to bring about change and set things in motion, and are committed to making their (or a group's) vision a reality. They also tend to know how to engage, respect, and empower others and are able to find new or leverage existing resources.

Because leadership is so important, many seek to encourage and nurture it. Some states offer grants to budding watershed associations. Several nonprofits maintain lists of watershed leaders who are willing to talk to others about their success. Other groups offer training and leadership workshops.

Napa County Conservation District

How You Get There is Flexible

"A Great Leader is One Whose Followers Say: 'We Did It Ourselves'."

- Lao-tzu

Dennis Bowker, Resource Conservationist for the Napa County Resource Conservation District (RCD), has worked with several groups in the Napa River Watershed community to address environmental and economic concerns.

These groups have been instrumental in working together to develop and implement a management plan for the watershed called the Napa River Watershed Owner's Manual. Dennis' experience in Napa, as well as with other watershed groups around the country, has reinforced the value of leadership emerging from and driven by the ideas of a community, rather than from any one individual. This view is quite different from the traditional one in which an expert figures out what is needed and then leads the troops. Ideas, developed and embraced by the community are not personality dependent and do not collapse with the departure of an individual. Different people are active at different times and use these community-driven goals to motivate, but the mutual overall effort remains paramount.

Dennis has found in working with community groups that focusing on improving environmental conditions and developing inclusive common goals, rather than on implementing policies and regulations has been vital to the implementation of management activities and the success of community-based efforts. This reinforces the community role. While subtle, it is an important difference that can lead to more effective partnerships. Individuals can work on the environment and can promote the development of common strategies without demanding common values. In fact, involving people with different values in working on a common strategy to implement those values reinforces the benefits of considering different perspectives and value systems from the beginning.

Examples in the Napa Watershed that demonstrate the value of this approach include:

- **The Conservation Regulations Community Task Force prepared an ordinance that requires an erosion control and water protection plan for**

all development on slopes exceeding five percent. This was in response to an erosion incident that caused a large amount of sediment to enter a local city water supply. The ordinance does not require implementation of a specific set of best management practices, but instead simply requires that the project prevent erosion and protect water quality, with professional review of the plans before permit issuance. The participation of the entire community in the watershed management effort is further demonstrated by the passage in 1996 of a county-wide parcel tax earmarked exclusively for watershed management.

- **The Napa Community Coalition for a Flood Plain Management Plan arose to take a major role in redefining an often-rejected plan by the Corps of Engineers first proposed over 30 years ago. The Community Coalition stepped forward to take leadership of the project, and turned it from a Corps of Engineers Project to a Napa Community Project with Corps participation as a partner. The Community assumed leadership of the effort in order to clearly state their desire for a living river with ecologically sound methods to address flooding, and participated aggressively in the design of a new program that better addresses community interests in accomplishing flood threat reduction, while maintaining close partnership with the Corps of Engineers.**
- **The Napa Sustainable Wine Growing Group is working to establish voluntary farm management guidelines to ensure that world quality wine will still be made commercially in the Napa Valley 200 years from now. A diverse group of commercial grape growers, agency employees, and university representatives are donating their time to develop a training and assistance program to promote environmentally sound long term farm management that will support community environmental and public health interests while also developing profitable farm operations.**

So where did this philosophy or approach come from? Dennis says this approach is a shift from hierarchical management to more horizontal, network-based management, used in evolutionary biology and in business. The approach increases the emphasis on desired outcomes and measured results in terms of environmental improvement, rather than on adherence to rules or to methods chosen to reach those outcomes. In watershed management, the focus becomes the watershed resource, not the policy meant to protect the resource. The purpose of the effort - environmental improvement - is paramount; how you get there is fluid and flexible.

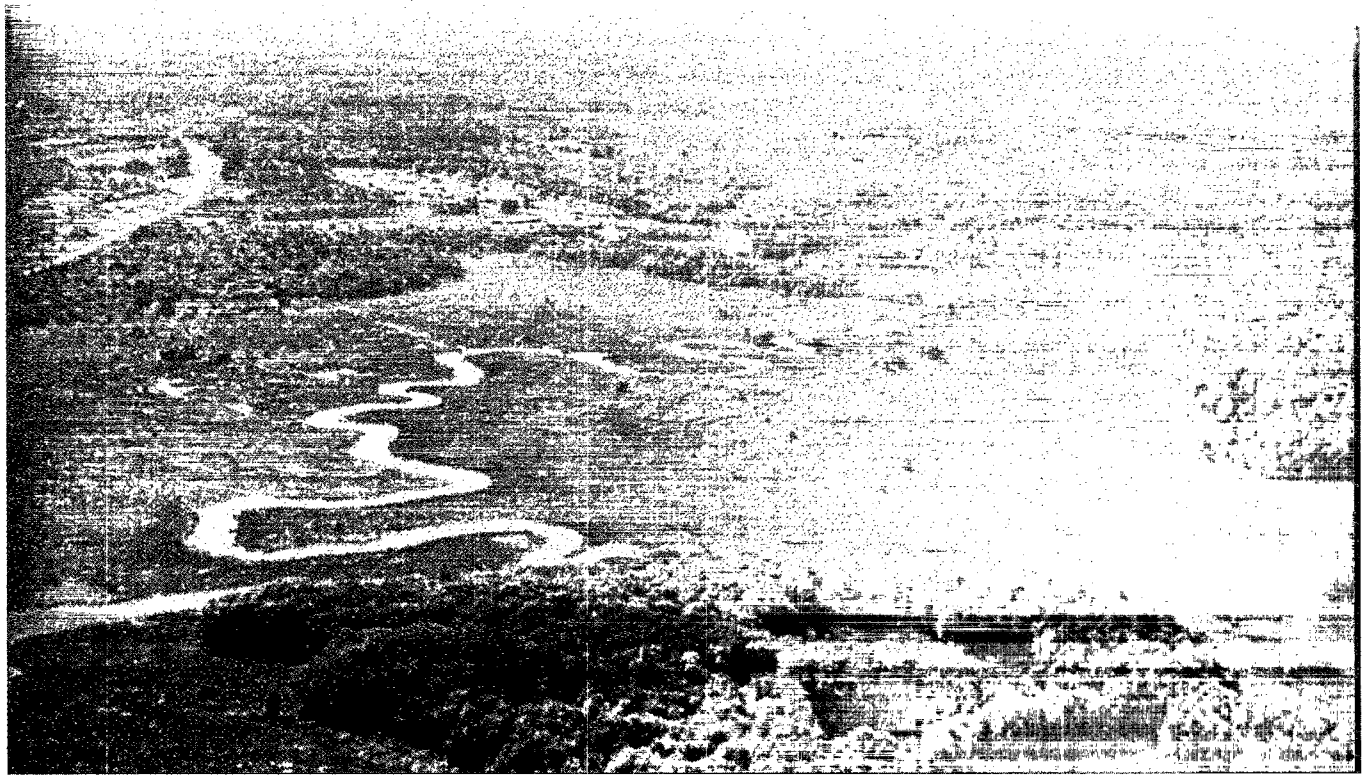
For more information:
contact Dennis Bowker, Napa County Resource Conservation District, 707-252-4188, 707-252-4219 (fax) 102223.2012@compuserve.com. See Key Contacts and Resources in this lesson for more information on his stewardship guide.

Adams County, PA Conservation District

Where Locals Guide the Action-expected savings in total nitrogen, alone, amount to over 150,000 pounds

Brian Sneeringer of the Adams County Conservation District explains the benefits of a recently installed manure storage facility to the Conservation District Board.
Photo Courtesy of Larry Martick, Adams County Conservation District.

The Adams County Conservation District has acted as one of 37 "local arms" for the State of Pennsylvania, Department of Environmental Protection (DEP) which is trying to reduce nitrogen loads in the Chesapeake Bay watershed by empowering local communities. Largely due to the Conservation District's leadership, more than 60 Adams County farmers now participate in a program which pays up to 80



Aerial view of the Charles River Watershed in Massachusetts where wetlands provide natural flood control functions.
Credit: Courtesy of the U.S. Army Corps of Engineers Slide Collection.

percent of the costs (not to exceed $30,000) of installing best management practices (BMPs) for controlling nutrient problems from erosion, barnyard runoff, and excess manure.

A secret to the District's success is that it has sought and followed the advice of its board which is comprised of people from the area. The board members are the community leaders who understand how the District might be able to get community landowners to participate. The District has used twilight meetings, farm open houses, news releases, and public speaking engagements to reach farmers. Thus far, they have allocated over $1 million for the installation of BMPs by Adams County farmers, and the results have been more than gratifying—expected savings in total nitrogen, alone, amount to over 150,000 pounds over the life of the program. Funding for the program comes largely from EPA and the Pennsylvania DEP.

In terms of lessons learned, Larry Martick of the District explains that he has learned that landowners care about local water quality conservation, and, to the extent he talks about that, it helps to sell the program.

For more information:
contact Larry Martick, Adams County Conservation District, 717-334-0636, 717-334-5999 (fax), adams.conservation@al.dep.state.pa.45

Massachusetts

Where Community Teams Make the Decisions

In Massachusetts, there have been leaders on many different levels. For example, Trudy Coxe, Secretary, Massachusetts executive Office of Environmental Affairs, at the State level, has been instrumental in ushering in fundamental changes in the way the State manages its water resources, aligning it around watersheds. She says that "government's job is to serve the watershed." And she means it. Ed Himlan, who had been a leader in an individual watershed, is now with the statewide coalition of watershed organizations. This coalition is working in concert with state and federal agencies to forge partnerships among government, business, civic, and environmental interests to enable sustainable watershed communities. Through this approach, decisions by informed individuals, organizations, and communities guide the application of local, state, and federal resources for ecosystem protection and management projects. Watershed Community Councils, designed as multi-interest, multi-stakeholder forums, are being established to serve a leadership role. They will provide a local voice for management of the watershed through consensus-based decision-making and priority setting.

This local-state integration is a key to the future success of management by watersheds, and it takes leadership to make it occur. Massachusetts is far along in the effort. A recent assessment by the Park Service and the Appalachian Mountain Club of New York and the New England States compared the number of groups dedicated primarily to river and watershed conservation. Not surprisingly, Massachusetts had the largest number. Citizen watershed associations have formed in almost all of Massachusetts' 28 major watershed basins, and more than 500 citizen groups are active in the Commonwealth, counting lake and pond groups, water monitoring projects, land trusts, sportsmen groups, and others.

For more information:
contact Ed Himlan, Massachusetts Watershed Coalition, 508-534-0379, 508-534-1329 (fax) or the Massachusetts Executive Office of Environmental Affairs, Massachusetts Watershed Initiative, 617-727-9800, x 227.

Key Contacts and Resources

YOUTH LEADER GUIDES AND TRAINING

- **Give Water A Hand,** handbook on how to be a good leader and what makes water protection work. Helpful tool for watershed coordinators. University of Wisconsin, 216 Agriculture Hall, 1450 Linden Drive, Madison, WI 53706, (608) 262-2031 fax, erc@uwex.edu, 1-800-WATER20, http://www.uwex.edu/erc, Elaine Andrews, 608-262-0142.
- **Watershed Leadership Institute,** a program that Adopt-A-Watershed has developed to train local leaders on their curriculum. They have found that local leaders are critical to making watershed education happen in schools and act not only as leaders but as ambassadors, consultants and facilitators. P.O. Box 1850, Hayfork, CA 96041-1850, 916-628-5334, 916-628-4212 (fax). www.tcoe.trinity.k12.ca.us/aaw/adopt.html.

LOCAL LEADERSHIP

- **Land Stewardship Watershed Plan Development: Cooperative Voluntary Natural Resource Protection, Enhancement and Management,** Dennis Bowker, NAPA County Resource Conservation District, 1303 Jefferson Street, Suite 500B, NAPA, California, 94559, 707-252-4188, 707-252-4219 (fax), 102223.2012@compuserv.com
- **Observations for Fostering Grass Roots Leadership in Your Watershed Program** short piece developed by Dennis Hall - (see Appendix 1). Operation Future Association (OFA), Big Darby Creek, County Extension Agent, Ohio State University Extension, Columbus, OH, 937-644-3162, hall.16@osu.edu. OFA takes farmers, developers and others on canoe trips that serve to inspire and nurture leadership. Started small, but it is now a flourishing nonprofit with 100+ members.

STATE AND REGIONAL NETWORKING MODELS

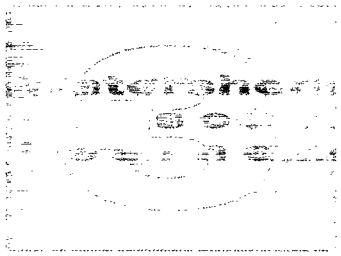
- **West Virginia Leadership Workshops.** West Virginia Division of Environmental Protection has held workshops where leaders of inclusive, consensus-based watershed associations gather to exchange information and inspire and challenge each other. In addition, the State has a new small grants program to nurture budding associations. In the first cycle, 19 $5,000 grants were awarded. Contact: George Constantz, West Virginia DEP, 304-856-3911, 304-856-3889 (fax).
- **Watershed Progress: Massachusetts' Approach,** US EPA Publication EPA840-F-96-004, describes how the watershed approach is making a difference in Massachusetts, call 800-490-9198 for a copy.
- **Chesapeake Bay Communities: Making the Connection, A Catalog of Local Initiatives to Protect and Restore the Chesapeake Bay Watershed.** US EPA Chesapeake Bay Program, EPA 903-R-95-108, April 1996. Describes local efforts to protect the Chesapeake Bay. 1-800-YOURBAY and press "1."

NATIONAL NETWORKING LISTS

- **River Network Watershed National Leaders List -** key network point for watershed leaders http://www.teleport.com/~rivernet/rivernet/leader2.htm
- **National Watershed Network** makes it easy for coordinators to network with each other. kyw@ctic.purdue.edu, http://ctic.purdue.edu/KYW/KYW.html. In addition, they have a guide called **Leading and Communicating** that discusses the traits of effective leaders.

NATIONAL AND STATE LEADERSHIP

- **Watershed Approach Framework,** EPA 840-S-96-001, http://www.epa.gov/OWOW/watershed/framework.html, describes what EPA means by the watershed approach. **Watershed Protection: A Statewide Approach,** describes the benefits of a rotating watershed approach, EPA841-R-95-004, http://www.epa.gov/OWOW/watershed/state/ Call 1-800-490-9198 for a free copy.
- **Developing Leadership,** Spring 1996, article on leadership by Abby Markowitz, Volunteer Monitor, http://www.epa.gov/volunteer/spring96/proman16.html or contact Eleanor Ely, Editor, The Volunteer Monitor, 1318 Masonic Avenue, San Francisco, CA 94117 for a copy. Please send a self-addressed stamped envelope.
- **Watershed Management: Toward Local Initiative in Solving Water Problems** and **Watershed Legislation: What Works and Why,** useful brochures analyzing the role of State legislatures in watershed protection. National Conference of State Legislatures, 1560 Broadway, Suite 700, Denver, CO, 80202, 303-830-2200, larry.morandi@ncsl.org. Larry Morandi.



Having a Coordinator at the Watershed Level is Desirable

The watershed approach to protecting our lakes and streams and other water bodies involves many stakeholders and, as a result, requires a lot of coordination. A good coordinator is key to a successful watershed protection effort.

Having a coordinator based within the watershed is important because it provides a focal point for the watershed effort and helps to ensure that someone is paying attention to moving group activities along. The coordinator's role varies depending on the needs of the watershed, but generally it includes maintaining contact with members of the watershed group; performing liaison with interested parties beyond the group; celebrating success; calling, facilitating, and summarizing meetings; helping to secure funding and training; and ensuring that watershed plans are developed, implemented, and effective in achieving the desired outcomes.

A coordinator may be a volunteer or a part-time or full-time paid staff person. He or she may be housed in government offices, a non-profit organization, or out of someone's basement. In general, they should be from a group that is trusted and that has the power to make a difference. The ideal coordinator is one who can commit to spending enough time to really make a difference. Part-time and volunteer coordinators have been able to accomplish a lot for watersheds, as have individuals located outside the watershed. As for funds, securing financial resources to support a staff person is not always easy; fortunately, many groups have been creative in establishing multiple funding sources to support watershed coordinators.

Tensas River Watershed

Benefits from Having a "Homegrown" Coordinator

The Tensas River Watershed, Louisiana, has benefited from the attention of Mike Adcock, born and raised in the area. His position has been funded through the U.S. EPA wetlands and nonpoint source programs, USDA Conservation District program, and the Nature Conservancy. The McKnight and National Fish and Wildlife Foundations have also provided funds.

Mike has been working in the Tensas River watershed for over four years. The major issue in the watershed is the severe loss of wetlands. Originally, 90 percent of the watershed was bottomland hardwood wetlands. Over 80 percent of these wetlands have been lost, resulting in flooding and in sediment and nutrient runoff to the river.

Since most of the remaining wetlands are on privately owned farms, landowner involvement is critical to restoring the water quality in the watershed. Being present in the community has helped Mike build trust with the farming community. This has involved a lot of one-on-one interaction. Mike began by identifying farmers in the watershed who were willing to demonstrate the economic benefits of wetlands restoration and conservation tillage practices.

For example, one farmer restored 640 acres of bottomland hardwood wetlands, then arranged for other farmers to visit his farm and see the benefits for themselves. Farmers listen to one another, which is demonstrated by the fact that the demand for enrollment in the Wetlands Reserve Program far exceeded the supply of funds in this watershed.

Duck Hunters Love It.

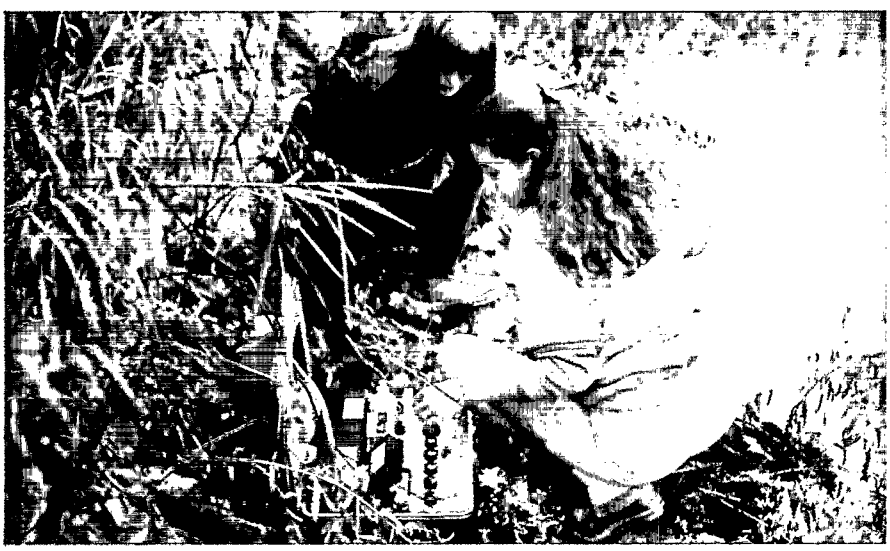
Mike Adcock emphasizes with farmers that the measures are voluntary, and he sees his role as a supportive one. Many farmers, he says, are interested in the economic benefits associated with good management practices, including such things as precision farming and water quality control structures. Water control structures not only allow for seasonal flooding of farm land, thereby providing increased time for sediments to settle out, but they have the added benefit of providing good habitat for waterfowl. Duck hunters love it, as do the farmers who receive the revenue.

For more information:
contact Mike Adcock, NE Delta RCD, 4274 Front Street, Winnsboro, LA 71295, 318-435-7328.

Stony Brook Watershed, Massachusetts

Where It Was Hard to Sustain the Effort with Just Volunteers

For more information:
contact Virginia Scarlet, 508-263-5710

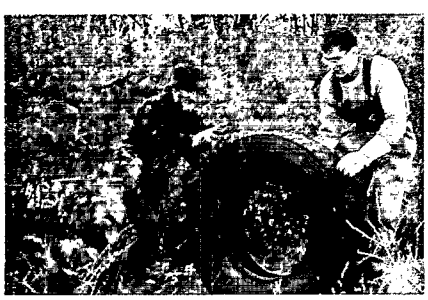


Ginny Scarlet, member of the Stony Brook Watershed Association in the Merrimack River Watershed, attests to the fact that it is difficult to sustain efforts without a dedicated coordinator. The group had funds to support a part-time coordinator to help develop a watershed "report card." When the funds ran out, volunteers had to jump in and finish the final report. After its completion, the group lost momentum to a large degree. Ginny says that they would like to be able to update the watershed report card and continue the monitoring necessary to assess the status of the watershed's resources, but it is on hold until the Association can get the ball rolling again.

Volunteer monitors sample water quality in the Stony Brook Watershed. (above)

Volunteers remove trash from impacted stream in the Stony Brook Watershed. (below)

Source: Ginny Scarlet, Stony Brook Watershed Association.



Key Contacts and Resources

FUNDING SOURCES

- **Watershed Protection: Catalog of Federal Programs,** describes federal programs that provide funding or technical assistance for watershed projects, EPA-841-B-93-002, available from EPA's publication clearinghouse, 1-800-490-9198. EPA staff contact, Joan Warren, 202-260-7796 (updating).
- **EPA Clean Water Act Section 319 Grants Guidance,** grant support through states to support nonpoint source control, www.epa.gov/OWOW/NPS/guide.html or contact EPA Nonpoint Source Branch, US EPA, 401 M Street, S.W., 4503F, Washington, D.C. 20460, 202-260-7100.
- **EPA Wetlands Grant Guidance,** grant support to locals and states to protect wetlands. Contact Lori Williams, USEPA, Wetlands Division, 401 M Street, S.W., 4502F, Washington, DC 20460, 202-260-5084. http://www.epa.gov/OWOW/wetlands/98grant.html
- **National Fish and Wildlife Foundation,** 1120 Connecticut Ave., NW, Suite 900, Washington, DC 20036, 202-857-0166, 202-857-0162 (fax), www.nfwf.org. Contact: Kathleen Pickering. Since 1990, this group has invested more than $1 million in federal matching funds toward formal and informal watershed education programs for youth, teachers, and other community members.

COMMUNITY SUPPORT TOOL

- **Sourcebook for Watershed Education** provides details on creating or enhancing programmatic support for watershed education and problem solving. It includes information on developing program vision and goals, obtaining community support and participation, program review and assessment, and sharing your story with others. Developed by Global Rivers Environmental Education Network, 206 South Fifth Avenue, Suite 150, Ann Arbor, MI 48104, www.econet.apc.org/green/ (313) 761-8142.

Environmental, Economic, and Social Values are Compatible

At the national conference Watershed '96 held in Baltimore, Jonathan Lash, from the President's Council on Sustainable development, reported on his team's survey of communities across the nation and approaches they were taking to achieve sustainability. In many instances, his group found watershed management was the approach they were taking. In his remarks, John recognized the watershed work going on across the nation and encouraged more as a means to achieving sustainability. While definitions of "sustainability" differ, it generally means viewing economic, environmental, and social values as complementary and interdependent and working to sustain all three over time (typically more than one generation).

Too often in the past, environmental and economic and social issues have polarized people, making it impossible to achieve a common vision of sustainability. For the watershed approach to become a reality, there must be widespread recognition in the community that people and nature can coexist within the watershed. This can pave the way for partnerships of diverse interests to form around a sustainable vision.

6th Grade students celebrate after a successful clean-up along Monoosnoc Brook and the North Nashua River. *Credit: Mrs. Wironen*

Nashua River Watershed, Massachusetts

Can Sustainability Be Achieved Through Management?

The Nashua River Watershed Association (NRWA), in its long-range plan, 1995 to 2020 Vision for the Nashua River Watershed, gives high priority to the need to "support resource-based economic activities, including sustainable farming, forestry and eco-tourism." Residents of the watershed recognize that protecting open space will provide positive economic returns. Through environmental education, resource-based community planning, and advocacy for resource stewardship, the NRWA attempts to achieve greater sustainability through cooperative management.

Some farming practices can have severe impacts on water quality by causing erosion, sedimentation, and fertilizer and pesticide runoff. Taking a sustainable approach, the NRWA suggests, means encouraging farmers to use integrated pest management and cost effective organic farming. An important goal of the plan is to seek the enlargement of greenway buffers along wetlands and other water bodies. To achieve this end, the NRWA's 2020 Plan calls for a mix of new incentives to farmers and additional support from the State agricultural department, local conservation districts, and extension services.

Local stakeholders at a kick-off meeting to develop the Nashua River 2020 Watershed Plan.
Credit: Nashua River Watershed Association.

According to the NRWA, the key to sustainable forests is the involvement of forest professionals: connecting those individuals who know how to manage forests to help educate landowners who want to learn. Currently, some property owners do not understand measures they could take to preserve high quality trees. Consultations with professional foresters will help fix that.

Utilize those individuals who know how to manage forests to help educate those who do not.

The NRWA also calls for the cooperation of local Chambers of Commerce, cultural groups, recreational enterprises, and other travel-related businesses to work together to foster "eco-tourism" in the Nashua River Watershed. Possible tour themes designed to attract visitors to the region include visits to "pick-your-own" apple orchards, farm stands, concerts, artisan studios, restaurants, and festivals. The tours would be small, utilizing vans rather than buses.

The NRWA developed the 2020 Plan with extensive community input. Consensus was achieved around an overarching vision for the watershed that was so compelling the NRWA adopted it as its own mission statement in 1996: "a healthy ecosystem with clean water and open spaces for human and wildlife communities, where people work together to sustain mutual economic and environmental well-being." Throughout all its work, the NRWA recognizes that economic, social, and environmental needs are compatible.

For more information: contact Robert Levite, 508-448-0299, 508-448-0941 (fax), nrwa@ma.ultranet.com

Blackstone River National Heritage Corridor

Water Quality is the Key to Community Development

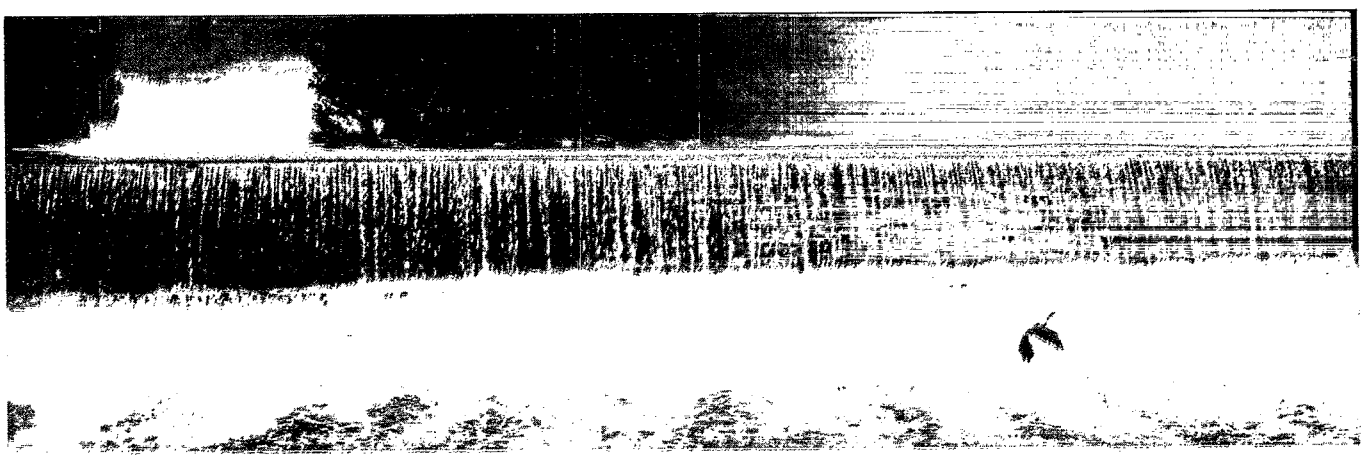
The Blackstone River located in Massachusetts and Rhode Island is rich in historic and natural resources. The Blackstone Valley is noted as the "birth place of the American Industrial Revolution." In 1790, Samuel Slater established in the valley the first successful water-powered textile mill in America. As a result of this new technology, mills and industry flourished - dramatically transforming the American landscape. While industrialization of the Valley produced economic prosperity, there were adverse side effects. Over a century of industrial use has taken its toll on the Blackstone River, which had served as a disposal site for pollutants incidental to the textile, leather making, woodworking, and metal working industries. The result was an extremely polluted river, and as industry migrated south, the pollution issues remained.

In 1986, the region's significance as an important part of America's cultural heritage was recognized when Congress established the Blackstone River Valley National Heritage Corridor Commission. The Commission consists of federal, state, and local representatives, as well as private citizens. The Commission's ability to leverage a relatively small federal investment with state and private funds has made it a model for conservation and economic development. Although the Commission owns no land, it is responsible for preserving and interpreting the significant stories and landscape features of the Blackstone Corridor.

The Commission invests in activities such as community and land use planning, heritage tourism, downtown revitalization, river restoration, recreation development along the river, interpretation, and environmental education. Many mill villages and communities throughout the river valley have realized the importance of working together. Many of the old mills have been retrofitted for a new century, supporting incubator businesses, residential businesses, residential housing, and retail outlets. Mill

villages recognize the importance of maintaining their historic character while developing sustainable economies. And the river itself is now looked upon as an asset again. The Blackstone River Valley Explorer, a river classroom vessel has carried over 70,000 people on the river for tours and educational field trips.

water quantity and flows, and wetland restoration and creation. The Commission understands the need to work at both a grand scale (that will take years and need major investments) as well as at the grassroots level. Most importantly, the river has once again become a focal for communities and businesses.



Majestic great blue heron enjoys the improved water quality of the Blackstone River.
Credit: John H. McShane, U.S. EPA

Communities throughout the Heritage Corridor recognize that a clean river is critical to revitalization. In a major restoration effort, Federal and state agencies are working with communities and organizations to improve the environment along the riverway. Current planning efforts by the Commission, the U.S. Army Corps, EPA, and others will address issues related to environmental restoration needs: waste water treatment, toxic sedimentation, historic dams, reintroduction of anadromous fish,

For more information:
contact Michael Creasey, National Park Service, Blackstone River Valley, National Heritage Corridor Commission, One Depot Square, Woonsocket, RI, 02895, 401-762-0250, michael_creasey@nps.gov or A. Elizabeth Watson, 301-262-5064, 301-805-8959 (fax), watsonaew@aol.com

Key Contacts and Resources

GREEN DEVELOPMENT AND PLANNING

- **Green Development: Literature Summary and Benefits Associated with Alternative Development Approaches,** US EPA, EPA 841-B-97-001, September 1996. Contact: Jessica Cogan, 202-260-7154. Includes information on environmentally sensitive infrastructure program and projects, case studies on urbanizing suburbs, model ordinances and plans, and environmentally friendly transportation plans. Call 1-800-490-9198 for a copy.
- **Sustainable Watershed Management at the Rapidly Growing Urban Fringe,** T. H. Cahill, J. McGuire, W. R. Horner, Cahill Associates, West Chester, PA, Dr. R. E. Heister, Executive Director, Green Valleys Association, Birchrunville, PA, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/cahill.html

LOCAL EXAMPLES OF AND GUIDES FOR SUSTAINABILITY

- **Chesapeake Bay Communities: Making the Connection, A Catalog of Local Initiatives to Protect and Restore the Chesapeake Bay Watershed.** US EPA Chesapeake Bay Program, EPA 903-R-95-108, April 1996, 1-800-YOUR-BAY. Describes local efforts to protect the Chesapeake Bay, many of which have sustainable development components, including Northampton County, VA's Coastal Program Special Area Management Plan for Sustainable Development, Sustainable Technologies Industrial Park, Prince William County, VA

Watershed Management Program.

- **Saving America's Countryside: A Guide to Rural Conservation,** Samuel N. Stokes, A. Elizabeth Watson, and Shelley S. Mastran. Baltimore: Johns Hopkins University Press, 1997 (first published in 1989). Order by calling 1-800-537-JHUP ($29.95 plus shipping and handling). Popular citizen's guide to rural resource planning and development issues with extensive bibliography. Uses case studies and covers economic development, rural issues, citizen organizing, resource inventories, planning basics, state and federal programs, and community education. Water quality, rivers, and watersheds are covered throughout and integrated with other planning issues.
- **Watershed Progress: New York City Watershed Agreement, EPA 840-F-96-005,** describes New York's approach to sustainable development to protect drinking water while saving money. Available for free by calling 1-800-490-9198 or on the web at http://www.epa.gov/OWOW/watershed/ny/nycityfi.html
- **Sustainability through Restoration: Experiences of the White Mountain Apache Tribe,** Jonathan Long, Watershed Planner, White Mountain Apache Tribe, White River, AZ, paper given at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/long.html
- **The NAPA River Watershed Owner's Manual: A Framework for Integrated Resource Management, 1994.** NAPA County Resource Conservation District. Contact: Dennis Bowker, 1303 Jefferson Street, Suite 500B, NAPA, California, 94559, 707-252-4188, 707-252-4219 (fax), 102223.2012@compuserv.com
- **Return to the Future: Watershed Planning-The Quest for a New Paradigm,** Eugene Z. Stakhiv Policy and Special Studies Division, U.S. Army Corps of Engineers, Institute for Water Resources, Alexandria, VA, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/stakhiv.html

ECOLOGICAL ECONOMICS

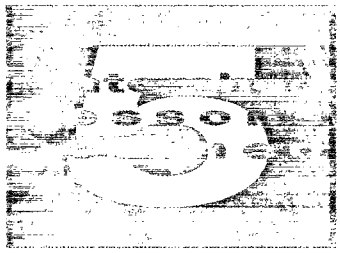
- **Taking Nature Into Account,** a nationally-publicized study that concluded the value of natural systems was nearly twice that of the combined value of the World's GDP ($33 vs. 18 trillion). Conducted by International Society for Ecological Economics, P.O. Box 1589, Solomons, MD 20608, 410-326-0794, Robert Constanza and Douglas Hinrichs, hinrichs@cbl.cees.edu, http://kabir.umd.edu/ISEE/ISEEhome.html

MARKET INCENTIVES

- **Appendix D: Examples of Market-Based Incentives, The Keystone National Policy Dialogue on Ecosystem Management, Final Report** October 1996, P.O. Box 8606, Keystone, CO, 970-468-5822. Includes description of Assurances, Conservation Banking, Forest Certification, Forest Legacy and Stewardship Programs, Public Benefits Rating System, Property Tax Stabilization in Growth Areas, Instream Flow Rights, Commercial and Recreational Use of Species, and Effluent Trading in Watersheds, Grass Banking, Air Quality Incentives, Local Wetlands Mitigation Banks, and Individual Transferable Quotas.
- **Forming a Partnership to Preserve Resources - The Virginia Beach Agricultural Reserve Program** Mary M. Heinricht, Coordinator Southeastern Association for Virginia's Environment, Virginia Beach, VA, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/heinrich.html. They succeeded in having the City Council adopt an easement program in 55 percent of the upland area of the watershed. Mary Heinricht, SAVE, P.O. Box 6733, Virginia Beach, VA, 23456, 757-460-0750.

NATIONAL EFFORTS

- **Watersheds and Cultural Landscapes: Sustainable Development through Heritage Areas,** A. Elizabeth Watson, Chair, National Coalition for Heritage Areas, Washington, DC, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/watson.html, Heritage and Conservation Consultant, 5103 Crain Highway, Bowie, MD 20715, 301-262-5064, 301-805-8959 (fax)
- **Center of Excellence for Sustainable Development Web Site,** Department of Energy, http://www.sustainable.doe.gov/index.html. Cited by the Planner's Web as a "top sustainability site." The toolkit includes pages that explain what sustainable development is, the role of indicators, and associated publications, software and educational resources. The toolkit's URL is http://www.sustainable.doe.gov/reflib.html
- **Wildlife Habitat Council,** has succeeded in putting on the ground, in partnership with corporations and others, enhancement projects on over 400,000 acres in 41 states. 1010 Wayne Avenue, Suite 920, Silver Spring, MD, 20910, 301-588-8994, 301-588-4629 (fax), whc@cais.com, http://www.wildlifehc.org/index.html Regional offices located in South Carolina, Michigan, and Kentucky. Robert Johnson, Vice President. **The Cooper River Corridor Project Community-Based Planning Initiative** is a key example of the power of partnerships to achieve sustainable development within a watershed context.
- **National Watershed Coalition,** 9150 W. Jewell Avenue, Suite 102, Lakewood, CO, 80232-6469, promotes the use of the watershed concept when dealing with natural resource issues.
- **Conservation Partnership Forum,** where conservation-oriented agencies, businesses, and organizations meet informally to share information and explore opportunities for more effective public/private conservation partnerships. Contact: Don Wells, National Association of Conservation Districts, 804-746-0148, 804-730-5911 (fax).
- **Golf and the Environment: Creating a Sustainable Future,** short pamphlet that describes environmental principles for golf courses in the United States, The Center for Resource Management, 1104 East Ashton Avenue, Suite 210, Salt Lake City, Utah, 84106, provides recommendations for environmentally sensitive golf courses. EPA contact: Phil Oshida, 202-260-6045.



Plans are essential in that they represent the consensus achieved among watershed stakeholders. Typical components of a plan include: vision, goals, action items, and time frame (see Watershed Lesson #1). Time frames for plans typically range from 5 to 20 years. The best plans allow for the incorporation of new information, reflect the needs of the watershed, and have the commitment of the community behind them.

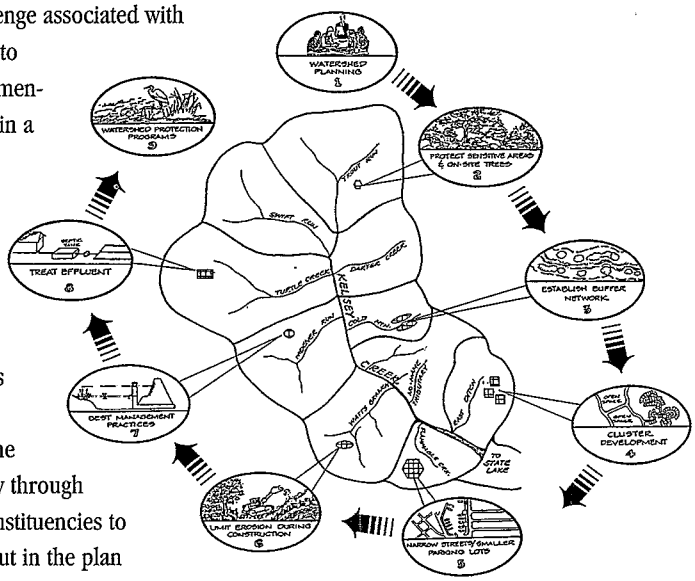
The greatest challenge associated with watershed planning is to ensure that the recommendations called for within a plan are implemented and that the plan does not sit on a shelf gathering dust in some office.

A key element in implementing a plan is charging an individual or organization with the responsibility to follow through and work with key constituencies to take the actions laid out in the plan (see Watershed Lesson #3). It is also important to break things down to a manageable scale. This often involves a "nested approach" in which broad goals are set for large watersheds but subwatersheds are used to implement and achieve those goals.

An Analysis of Urban Watershed Plans

Tom Schueler's Insights into What Works and What Doesn't

Tom Schueler, Executive Director, Center for Watershed Protection, interviewed a number of watershed practitioners from a wide cross-section of disciplines (planners, municipal officials, consultants, scientists, and others) and found that most agree that the majority of plans developed in the past have failed to adequately protect their watersheds. A chief reason is that they were drawn up on too large a scale — 50 square miles or more. Too many subwatersheds and their individual problems had to be consolidated, and the focus of the plans became blurred. As the number of stakeholders proliferated, responsibility for implementing the plans became diffused. In short, says Schueler, the planning process got too big, too complicated to be effective.



NineTools for Watershed Protection

The Center for Watershed Protection recommends thinking about watersheds on a manageable scale in order to help make plans implementable.
Credit: Provided by the Center for Watershed Protection

A typical municipality or county might have 10 to 50 subwatersheds to manage.

Based on their analysis of these first-generation watershed plans, the Center proposed a dozen elements that every plan should incorporate. Chief among them, the plan should be developed around the subwatershed unit—one having a drainage area of 2 to 15 square miles. Due to their size, many subwatersheds are entirely contained within a single political jurisdiction, which helps to establish a clear regulatory authority. A typical municipality or county might have 10 to 50 subwatersheds to manage. On a small scale, such as this, subwatershed mapping, monitoring, and

other study tasks can be completed relatively quickly (6 to 12 months) and the entire management plan completed within a year.

The Center also underscored the need to create an authority, either at the watershed or subwatershed level, that is invested with the primary responsibility for implementing the plan. Perhaps the greatest reason cited for consigning plans to the bookshelf where they languished in obscurity was that no one was required to pull them down and use them as a routine part of the land development process.

For more information:
contact Thomas R. Schueler, 301-589-1890, 301-589-8745 (fax).

Cedar River, Washington

Local Government Is Not a Missing Piece

Jean White, project manager for the Cedar River Basin Plan in Washington State and with the King County Water and Land Resources Division, has been charged with implementing the plan that was developed for Cedar River by a variety of interests including state, local, and tribal governments, business and community representatives. Essentially, her goal is to make the plan's recommendations a reality on the ground. Part of this includes having it formally adopted by King County as policy; the other part is getting projects in place.

Two homes have been purchased and four others are in negotiation to be purchased.

As Jean describes it, the plan is quite ambitious with about $64 million worth of effort and three priorities: habitat protection and restoration, flood protection, and water quality improvement. A list of priority habitat acquisition sites has been developed and many sites have already been purchased. A list of 80 potential habitat restoration projects has also been developed and several have been completed. The plan calls for purchasing and relocating over 100 homes in the most flood prone areas on a voluntary basis. Two homes have been purchased and four others are in negotiation to be purchased. To improve water quality, the plan calls for improved storm water control in new developments and emphasizes reducing problems before they start.

The formation of the Cedar River Council as a public forum to address Cedar River issues has raised public awareness, understanding, and support for the actions called for in the plan. In addition, the leadership of Larry Phillips, chair of the Cedar River Council, has been critical, especially in helping to obtain funds to support plan implementation.

Demonstrating success has also been important. For example, it is very persuasive to be able to take residents to one of the stream restoration sites and show the progress that has been made.

As for lessons to share, Jean, who has worked with nonprofits as well as at the State level, feels that getting the local government involved is often a missing piece. Given the fact that local government controls land use and has access to funding and decision-making authority, she believes they are critical players in making the watershed approach a reality.

Another thing that has worked well for King County is their River Basin Stewards. A Basin Steward acts as a community contact who answers citizen questions and requests and organizes volunteer stewardship events.

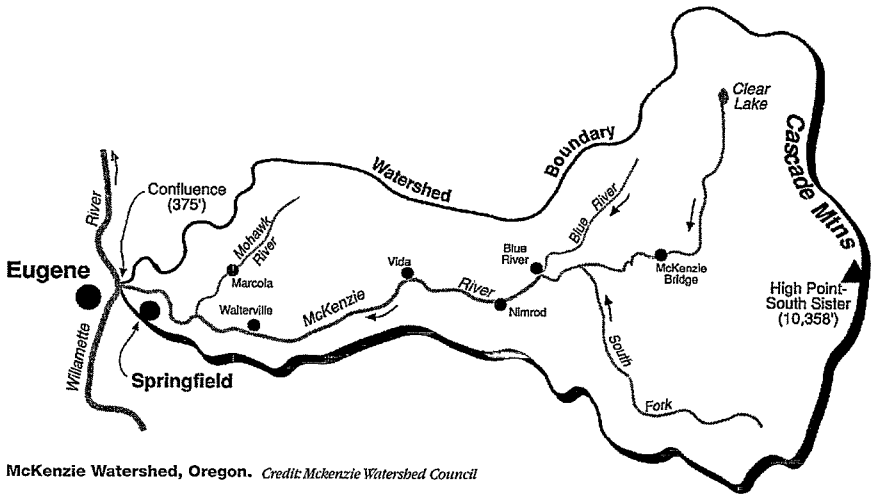
For more information:
contact Jean White, Project Manager, Cedar River Basin Plan, Staff for Cedar River Council, Surface Water Management Division
206-296-1479, 206-296-0192 (fax),
jean.white@metrokc.gov.

McKenzie Watershed Council, Oregon

Action at the Subwatershed Level

Over 200,000 residents of Lane County, Oregon, depend on the McKenzie River watershed for their drinking water. They also use the river for fishing, rafting, and other recreational activities. Agricultural and other industrial users rely on the river to supply them with large amounts of high quality water for their operations. Development in the McKenzie Watershed and other pressures have in recent years threatened the capacity of the river to sustain the quality of its water.

A partnership of two local governments led to the creation of the McKenzie Watershed Council. Lane County and the Eugene Water & Electric Board acted as conveners to organize, seek start-up funds, and provide early support and direction. The Council's mission statement reads: "To foster better stewardship of the McKenzie River Watershed resources, deal with issues in advance of resource degradation and ensure sustainable health, functions, and uses." The 20-member council was formed in 1993 and is made up of private citizens, public interest groups, locally elected officials, representatives of state government, as well as representatives of the Bureau of Land Management, Army Corps of Engineers,



McKenzie Watershed, Oregon. *Credit: Mckenzie Watershed Council*

and the U.S. Forest Service. EPA provided start-up funds and the NRCS and BPA (Bonneville Power Administration) have contributed funds for completing the action plans and public outreach.

The Council adopted a work program which focused on four topics: water quality, fish and wildlife habitat, recreation, and human habitat. The Council has adopted Action Plans for all four work program topics and has begun implementing several of the prescribed actions, including three key programs: watershed-wide water quality monitoring, citizen water quality monitoring, and restoration and enhancement projects.

Watershed-wide Water Quality Monitoring Program

With the Eugene Water & Electric Board, a local utility, taking the lead, the Council worked with a team of technical advisors to put into place a coordinated approach to long-term water quality monitoring. The Oregon Department of Environmental Quality conducts the monitoring at seven stations in the watershed, as well as providing part of the funding. Other funding comes from council partners Eugene Water & Electric Board, Army Corps of Engineers, Bureau of Land Management, and U.S. Forest Service. Since its inception in November of 1995, the monitoring program has expanded cooperation among the council, the Oregon Department of environmental Quality, and technical advisors from both the public and private sectors.

Citizen Monitoring Program

A partnership with RARE (Resource Assistance to Rural Environments, part of the President's Americorps Program) has been critical to the success of the McKenzie Watershed Council's Citizen Monitoring Program. This volunteer program engages students throughout the watershed in the

evaluation and monitoring of water quality parameters, and has been a very effective outreach tool. Started with a grant from the state in 1995, the program now involves over 200 students from six schools monitoring five sites on a weekly basis. RARE workers have been involved from the beginning—from designing the pilot program to training students and working with them on a weekly basis to do the sampling over the last two years.

Restoration and Enhancement Projects in the Mohawk Watershed

The East Lane Soil and Water observation District, with funding and technical assistance from the Natural Resources Conservation Service, targeted the Mohawk subwatershed, the largest tributary to the McKenzie, for establishing demonstration projects and conducting outreach. They have been assisting the Mohawk Watershed Planning Group, comprised of local landowners, in developing and implementing a plan at a subwatershed level. The Council serves as an umbrella organization for the Mohawk group and others like it, providing broad direction, support, and assistance in seeking resources for implementation.

The efforts in the Mohawk have resulted in over two dozen local landowners coming forward to enhance their own stream banks. The projects have ranged from fencing cattle away from streams to plantings along riparian areas on golf courses. In addition, over 9,000 native trees and shrubs have been planted in partnership with several programs, including the Youth Corps, the Jobs-in-the-Woods dislocated timber workers program, students from five schools, and innumerable community volunteers. Students at Mohawk High School have planted an arboretum, and a local science teacher and garden club have adopted a Native Plant Salvage Nursery.

For more information:
John Runyon, Watershed Coordinator, McKenzie Watershed Council, P.O. Box 1025, Corvallis, OR 97333, 541-758-0947, 541-766-8336 (fax), runyon@poraxis.com; Laurie Power, Environmental Manager, Eugene Water & Electric Board, PO Box 10148, Eugene, OR 97440, 541-341-8525, FAX 541-984-4724, laurie.power@eweb.eugene.or.us; Megan Smith, RARE Coordinator, UO Community Planning Workshop, 1209 UO, Eugene, OR 97403, 541-346-3889, FAX 541-346-2040, smith@darkwing.uoregon.edu; Lorna Baldwin, Watershed Planner, East Lane Watershed Soil and Water Conservation District, 541-465-6648, 541-465-6483 (fax), lbaldwin@efn.org

Key Contacts and Resources

IMPLEMENTING URBAN PLANS

- **Crafting Better Urban Watershed Protection Plans,** Thomas R. Schueler, Center for Watershed Protection, 8737 Colesville Road, Suite 300, Silver Spring, MD 20910, 301-589-1890, 301-589-8745 (fax), http://www.pipeline.com/~mrrunoff/ Nice analysis of how to keep local watershed plans from sitting on the shelf. Addresses impervious surfaces as a key indicator in watersheds.

FINANCING PLAN IMPLEMENTATION

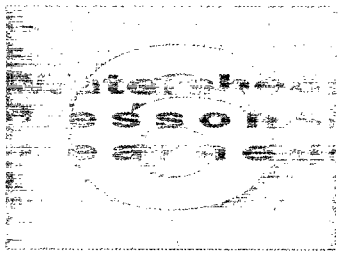
- **Beyond SRF: A Workbook for Financing CCMP Implementation,** US EPA, EPA 842-B-96-002, August 1996. Guide designed to provide innovative financing ideas for implementation of plans under the National Estuary Program. 1-800-490-9198. Ideas are transferrable beyond the NEP program.
- **EPA Clean Water Act Section 319 Grants Guidance,** grant support through states to support nonpoint source control, www.epa.gov/OWOW/NPS/guide.html or contact EPA Nonpoint Source Branch, US EPA, 401 M Street, S.W., 4503F, Washington, D.C. 20460, 202-260-7100.

EXAMPLE PLAN

- **McKenzie Watershed Council, Action Plan for Recreation and Human Habitat and Summary and Highlights of Accomplishments,** March 1997, John Runyon, Coordinator, McKenzie Watershed Council, 541-758-0947, 541-766-8336 (fax) Plan outlines vision, goals, and priority action items.

GUIDANCE FOR STIMULATING SUPPORT

- **Sourcebook for Watershed Education** provides details on creating or enhancing programmatic support for watershed education and problem solving. It includes information on developing program vision and goals, obtaining community support and participation, program review and assessment, and sharing your story with others. Developed by Global Rivers Environmental Education Network, 206 South Fifth Avenue, Suite 150, Ann Arbor, MI 48104, www.econet.apc.org/green/ 313-761-8142.



Partnerships Equal Power

"Far different from the adversarial emphasis of traditional environmentalism, the focus of the watershed approach is to work cooperatively to build healthy watershed communities."

*—Joy Huber, **River Voices**, Fall/Winter, 1995*

Give credit where due.

Watershed work is about partnerships. Essential ingredients for effective partnerships include: focusing on common interests, respecting each participant's view point, thanking each other, being willing to learn about others' needs and positions, and building trust. The important thing is to pull together a partnership that is of manageable size, creates synergy, and represents the key interests in the watershed.

No one entity can solve all the issues in any given watershed. Watershed partnerships come in all shapes and sizes, with each partner having a different interest. Some partnerships are loosely structured, while others are quite formal. Some groups are open, while others are closed — meaning they do not allow anyone else to join. Regardless of how they are structured, making partnerships work is challenging and takes commitment. Common issues that partnerships face include selecting a leader, ensuring that all the right people are involved, and moving beyond any hostility that may exist among members. If a group is able to develop esprit de corps, they can be quite effective. To get past the "forming and storming stages," some groups have set ground rules under which individuals can complain for only a certain amount of time, after which they must move on. Some groups have decided to say that issues that are too divisive are not to be discussed.

Partners can include anyone who has an interest in the watershed. This ranges from conservation groups, local elected officials, chambers of commerce, environmental education organizations, local military bases, farm groups, students, senior citizen and religious organizations, financial groups, credit unions, and land developers, among others. The important thing is to include all the key interest groups so that you can tap into their strengths, increase your credibility, reduce duplication of effort, and make optimal use of limited funds.

In terms of lessons learned, experienced watershed practitioners say that one-on-one contact is most effective in eliciting support. Further, building partnerships takes time and commitment, and once built they need to be nurtured. However, their benefits are clear as they can lead to wider acceptance and quicker implementation of projects.

Cheat River, West Virginia

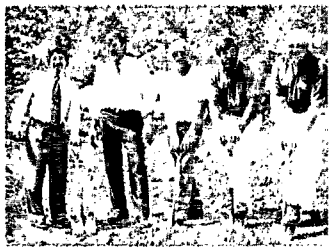
Where Partnership Improves Everyone's Quality of Life

"The 'River of Promise' is a perfect example of [a] partnership approach in action."

—Joe Piotrowski, Associate Director, Office of Watersheds, U.S. EPA Region 3

When a major acid mine blowout turned the Cheat River orange, concerned stakeholders in the watershed mobilized to form Friends of the Cheat. Water quality had been bad for many years, but now it was much worse and time to address the runoff from over a century of coal mining. "We could have focused all of our energy on confronting the parties responsible for the degradation, but we recognized that this was just one part of a much greater issue," says Dave Bassage, FOC Executive Director. "Acid mine drainage is a huge problem in the Cheat, and we knew we would need to tap into every possible resource to address it."

Friends of the Cheat brought together over 20 groups to restore the Cheat watershed by collaborating, sharing information, and building on each other's work. The various interests developed and signed a proclamation called "River of Promise: A Shared Commitment for the



Restoration of the Cheat River, West Virginia." Signatories included federal and state agencies, environmental groups, local government, and a coal company.

The River of Promise Task Force meets quarterly to monitor progress and coordinate future projects. In 1996, reclamation projects funded at a total of more than $6 million were initiated; the state took on a comprehensive water quality assessment, the USGS installed a critical sampling station, and EPA made available $200,000 for Friends of the Cheat to implement projects in the watershed under the direction of the River of Promise Technical committee.

"We've got a long way to go," says Bassage, "but water quality has already started to improve. By focusing on partnerships and including a broad range of interests, we have eliminated hurdles and opened doors. We'd rather shake hands than raise our fists, and that strategy has really paid off."

The key to effective partnerships, he feels, is to get all potential interests in a room together and work towards consensus, rather than trying to coordinate from a distance. He notes that the spirit of cooperation is now so strong that it is often difficult to tell which groups individuals represent.

One important lesson, he believes, is the value of involving local industry in the effort. This lends much needed credibility to the partnership, and allows the community as a whole to see that the effort works and is not about big government, special issues, and confrontation. On the contrary, it is inclusive, broad-based and focused on a goal (clean water) that benefits everyone and improves the quality of life.

For more information:
contact Dave Bassage, Friends of the Cheat, 304-379-3141, 304-379-3142 (fax), dbassage@access.mountain.net

White water rafters enjoy the 'big nasty' rapid on the Cheat River in West Virginia. *Credit:Wild Rivers Photography*

(Top of this page) Ground breaking ceremony for the Green Run Reclamation Project in the Cheat River Watershed. From left to right, Bob Uram, Director, Office of Surface Mining; John Garamendi, Deputy Secretary of the Interior; Troy Titchenell, Anker Energy; Dave Bassage, Friends of the Cheat; John Faltis, President, Anker Energy. *Credit:Provided by Dave Bassage, Friends of the Cheat.*

Fish Creek Watershed, Indiana and Ohio

Can Partners Look Beyond Their Individual Interests?

The effectiveness of stakeholder partnerships is well illustrated in the work being done at the Fish Creek Watershed, which drains 110 square miles of agricultural land in northeast Indiana and northwest Ohio. The creek is noted for having the most diverse assemblage of freshwater mussels in the Great Lakes Basin: 31 species inhabit the creek. Of these, three are endangered. Soil erosion and loss of wetlands and forest land threaten the system.

Together, partners from a multitude of public and private organizations have succeeded in reforesting land along the creek, fencing livestock, restoring wetlands, and creating a nature reserve. Larry Clemens, of the Nature Conservancy, attributes the success of the project to the fact that each partner is able to look beyond his or her organization's "traditional" interest and focus on the needs of the watershed.

The partners share a vision that water

Reforestation along the Fish Creek Watershed in Indiana.

quality should be protected in a way that allows for economic development. Implementing the vision requires a lot of "cold calling" on the part of the partners to build bridges with landowners. They also use a local advisory group to solicit the input of local citizens in individual projects.

The project manager shared this information with the partners, who then stepped forward with the funds.

The reforestation project, which affected some 265 acres of row crop (corn and soy beans) fields along the creek, is a tangible example of how the partnership works. Not sure of where to begin, the project manager turned to the local advisory group and asked for guidance. Knowing the community, the group strongly recommended that, as a first step, the Fish Creek Watershed Project should offer to pay 100 percent of the reforestation costs. The project manager shared this information with the partners, who then stepped forward with the funds. Funding partners included US Fish and Wildlife Service, Soil Conservation Service (now Natural Resources Conservation Service), local soil and water conservation districts, OH Department of Natural Resources, IN Department of Natural Resources, National Turkey Federation, US EPA, and the Nature Conservancy.

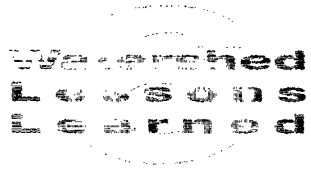
For more information:
contact Larry Clemens, 219-665-9141, 219-665-9141 (fax) or visit the Nature Conservancy's home page and see the Indiana subsection, www.tnc.org.

Know Your Watershed

A Key Resource for All Partnerships

Know Your Watershed, a public-private partnership operating out of West Lafayette, Indiana, supports existing watershed partnerships and helps in the creation of new ones. Its goal is to have 2000 watershed partnerships in the nation by the year 2000. As of mid-1997, it had identified over 1000. Know Your Watershed supports watershed-to-watershed networking, technology transfer efforts, and capacity building at the regional, state, and local levels. Their Starter Kit (see Lesson #7 under Key Contacts and Resources) hones in on the keys to making watershed groups work. Project Manager Karol Keppy explains, "Lack of funds and lack of a full-time watershed coordinator are often excuses. The real problem usually lies deeper. It centers on fear of conflict, fear of working with the 'opposition,' or lack of sincere understanding of all the sides of issues."

Know Your Watershed works with national and state partners to multiply the watershed approach message. For example, partners like Tennessee Valley Authority, River Network, North American Lake Management Society, and others joined together in 1997 to sponsor a Southeast Regional Watershed workshop in Chattanooga, TN. Another example is a Farmer-Led Watershed Initiatives Conference



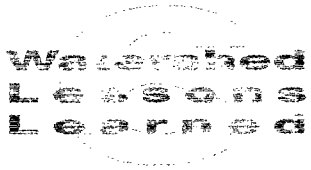
sponsored by the National Pork Producers Council, Dupont, Novartis, the Institute for Agriculture and Trade Policy, and the McKnight Foundation in Mankato, Minnesota. Further, in the Elk Creek Watershed in Montana, the Adopt-A-Stream project and the local conservation district worked with the Montana-based Know Your Watershed, an independent state effort that utilizes materials created by the national partnership, to hold a workshop at which local residents decided to establish a watershed council. A 20-year vision was also developed: the creek was to be "running full length with good water" and was to have "numerous fish" and "happy neighbors." The new council wanted to correct the severe erosion problems in the creek that had begun with a 1995 flooding. This new partnership has been successful in securing a Section 319 grant and State Fishery grants to help support their pilot restoration project.

For more information:
contact Know Your Watershed,765-494-9555, 765-494-5969 (fax), kyw@ctic.purdue.edu or Jill Davies, 14 Old Bull River Road, Noxon, MT 59853, nox2228@montana.com (e-mail).

Key Contacts and Resources

PARTNERSHIP SUCCESS STORIES AND INITIATIVES

- **Water Works: Your Neighbors Share Ideas on Working in Partnership for Clean Water: 1997, Tennessee Valley Authority, Water Management, 400 West Summit Hill Drive, WT 10D, Knoxville, TN, 37902-1499, Kathleen O'Brien, (lead author), 423-632-8502, 423-632-3188 (fax),** kobrien@tva.gov, guide describing Tennessee Valley community leaders' efforts to form groups and keep their momentum - journalistic approach with on-the-ground examples. Provides many ideas for developing partnerships that work. Stories of Shirley Turner, Larry Zehnder, and Lynn Smith in particular.
- **Watershed Management: Four Examples,** 60 minute video featured at Watershed '96 conference satellite down link, $34. Great partnership examples, especially Henry's Fork, ID. Other case studies are Greenwich Bay, RI, Milwaukee River, WI, and Edward's Aquifer/Seco Creek, TX. Produced by Department of Soil and Atmospheric Sciences, Cornell University and Cornell Cooperative Extension, Cornell University Resource Center, 7 Business/Technology Park, Ithaca, NY 14850, Phone: 607-255-2090, Fax: 607-255-9946, e-mail: Dist_Center@cce.cornell.edu
- **Mark Twain Water Quality Initiative:** an alliance of farmers, soil and water conservation districts, government, agri-business, community officials, educators, schools, financial institutions, health departments, private industries, real estate boards, trade and commodity organizations, and special-interest groups to safeguard the water quality of Mark Twain Lake and six other public water supply reservoirs. This 18,000 acre lake is an important drinking water source in Northeast Missouri being threatened by agri-chemicals, nutrients, and sediment. Contact: Ray C. Archuleta, Water Quality Project Manager, Mark Twain Water Quality Initiative, USDA-NRCS Macon, MO 816-385-6359 for additional information.
- **Coastal America: A Partnership Paradigm for Protecting and Restoring Ecosystems and Watersheds,** Virginia Tippie, Director, Gail Updegraff, Deputy Director, Coastal America, Silver Spring, MD, paper delivered at Watershed '96, http://www.epa.gov/OWOW/watershed/Proceed/tippie.html
- **Grande Ronde Model Watershed Program "Partnership for Success,"** Patty Perry, Executive Director Grande Ronde Model Watershed Program, LaGrande, OR, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/perry.html
- **McKenzie Watershed Council's Water Quality Partnership,** (funded by several Council partners) has been instrumental in developing and implementing a long-term water quality monitoring program that will assist in monitoring the health of the river over time. Coordinator, John Runyon, 541-752-0947, P.O. Box 1025, Corvallis, OR 97333, 541-766-8336 (fax), runyon@poraxis.com
- **Partnerships That Pay Off: TVA's Watershed Approach,** Wayne Poppe, Acting Manager Renee Hurst, Education Specialist, Clean Water Initiative, Tennessee Valley Authority, Knoxville, TN, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/poppe.html
- **National Nonpoint Source Forum,** Larry Selzer, Conservation Fund and Chair of Forum, remarks at Watershed '96 http://www.epa.gov/OWOW/watershed/selzer.html Excellent example of broad-based partnerships involving the public and private sectors. Tangible result is the National Watershed Awards. EPA Contact: Carl Myers, 202-260-7040, myers.carl@epamail.epa.gov
- **CREEC: A Central Oregon Partnership Focused on Watershed Education and Restoration,** Dean Grover, Forest Fisheries Biologist, Ochoco National Forest, Prineville, OR, David A. Nolte, Bring Back the Natives Project Coordinator, Trout Unlimited, Redmond, OR, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/grover.html
- **Rathbun Land and Water Alliance,** broad-based alliance, established as a non-profit, working to protect the drinking water supply in south central Iowa (rural community). Contact: Jim Cooper, 515-437-4376.



- **China Lake Watershed Restoration Project Alliance,** established in 1994 as a regional nonprofit corporation to protect their drinking water and other uses of the lake. Involves three lake associations, three towns, a water district and a local water utility. Contact: Tony St. Peter, Maine Department of Environmental Protection, 207-287-3901, or Norm Marcotte, 207-287-7727, www.state.me.us/dep/npst54.htm
- **Golf and the Environment: Creating a Sustainable Future,** Environmental Principles for Golf Courses in the United States, short pamphlet developed by The Center for Resource Management, 1104 East Ashton Avenue, Suite 210, Salt Lake City, Utah, 84106, provides recommendations for environmentally sensitive golf courses. EPA contact: Phil Oshida, 202-260-6045.

PARTNERSHIPS WITH CORPORATIONS AND FARMERS

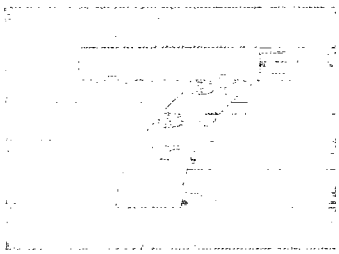
- **Wildlife Habitat Council,** has succeeded in putting on the ground, in partnership with corporations and others, enhancement projects on over 400,000 acres in 41 states. 1010 Wayne Avenue, Suite 920, Silver Spring, MD, 20910, 301-588-8994, 301-588-4629 (fax), whc@cais.com, http://www.wildlifehc.org/index.html Regional offices located in South Carolina, Michigan, and Kentucky. Robert Johnson, Vice President. **The Cooper River Corridor Project Community-Based Planning Initiative** is a key example of the power of partnerships to achieve sustainable development within a watershed context.
- **The Pork Industry's Environmental Partnerships,** Environmental Services, National Pork Producers Council, paper delivered by Jeff Gabriel at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/gabriel.html
- **Farm-A-Syst,** Gary Jackson, 608-265-2773, 608-265-2775 (fax), paper presented at Watershed '96, http://www.epa.gov/OWOW/watershed/Proceed/jackson.html

GENERAL PARTNERSHIP NETWORKING TOOLS AND MODELS

- **Watershed Education: Goals and Strategies for Training, Communication and Partnerships,** short piece summarizing the outcome of a session that the National Fish and Wildlife Foundation hosted in 1996 where approximately 60 key watershed educators gathered. Good discussion of partnerships., 1120 Connecticut Ave., NW, Suite 900, Washington, DC 20036, 202-857-0166, 202-857-0162 (fax), www.nfwf.org. Contact: Kathleen Pickering.
- **West Virginia Watershed Network** coordinates financial and technical assistance to local watershed associations, including newsletters to groups, statewide networking. Contact: George Constantz, West Virginia DEP, 304-856-3911, 304-856-3889 (fax).
- **National Watershed Network,** Know Your Watershed, 765-494-9555, 765-494-5969 (fax), kyw@ctic.purdue.edu, http://www.ctic.purdue.edu/Watershed/WatershedOptions.html
- **Sourcebook for Watershed Education** provides details on creating or enhancing programmatic support for watershed education and problem solving. It includes information on developing program vision and goals, obtaining community support and participation, program review and assessment, and sharing your story with others. Developed by Global Rivers Environmental Education Network, 206 South Fifth Avenue, Suite 150, Ann Arbor, MI 48104, www.econet.apc.org/green/ 313-761-8142.
- **1996-1997 River and Watershed Conservation Directory,** River Network and the Department of Interior National Park Service, includes approximately 3,000 organizations whose missions directly involve river and/or watershed conservation. River Network, P.O. Box 8787, Portland, OR, 503-241-3506, rivernet@igc.apc.org, 503-241-9256 (fax)
- **Missouri Watershed Information Network,** clearinghouse for watershed information in Missouri, Jerry Carpenter, University of Missouri Extension, 573-882-0085, jerry_d._carpenter@muccmail.missouri.edu, Chris Bromley, administrative assistant, Chris_Bromley@muccmail.missouri.edu. Partnership of state and federal agencies, non-governmental organizations, natural resource interest groups, and private industries.

PARTNERSHIP GUIDES AND RECOGNITION PROGRAMS

- **Using Nonprofit Organizations to Advance Estuary Program Goals,** EPA842B093008, November 1993, 1-800-490-9198. While designed for estuaries, this document examines how nonprofit organizations can fulfill the role of attracting and receiving funds as well as carrying out implementation and oversight. This document may be useful to watershed groups who are considering working with or setting up a nonprofit. Contact: Betsy Tam, EPA, 202-260-6502.
- **Watershed Partnerships: A Strategic Guide for Local Conservation Efforts in the West,** 1997, Western Governors' Association, 600 17th Street, Suite 1705, South Tower, Denver, CO, 80202-5452, www.westgov.org, 81 pages, http://www.westgov.org/wga/publicat/wsweb.htm
- **National Watershed Awards,** annual award program to recognize innovative watershed protection by communities, http://www.terrene.org/cfaward.htm, http://www.epa.gov/OWOW/watershed/cfindust.html, http://www.ctic.purdue.edu/KYW/KWY.html



Good Tools Are Available

Good tools are essential to the success of the watershed approach. Tools are broadly defined to include geographic information systems, "how to" guides, funding sources, regulations (when appropriate), and monitoring and modeling programs. The sources of funds and technical assistance vary widely, from corporate, government, to nonprofit organizations.

In many watersheds, technical advisors are critical to the effort as watershed residents need a sound, scientifically-based understanding of the resource in order to make good decisions. Some studies suggest that one of the biggest challenges for watershed groups is securing funding. Many states have special funds to support watershed groups, but using creativity in finding other sources is always needed. GIS maps have been very helpful to watershed efforts and have served to educate constituency groups such as town councils and landowners. Fortunately, many tools are available to assist watershed groups.

Project NEMO

Impervious Surface Analysis Can Be Startling

The Nonpoint Education for Municipal Officials (NEMO) Project of University of Connecticut Cooperative Extension is demonstrating the power of using Geographic Information Systems (GIS) to advance watershed protection. And, while NEMO uses GIS and remote sensing (RS) for limited watershed analysis, NEMO Project Director Chester Arnold stresses that the most important — and most often overlooked — use of these high-tech tools is for education.

One aspect of NEMO that really gets people's attention is the project's analysis of impervious surfaces.

NEMO uses the power of computerized GIS maps to educate busy local land use decision makers on the complexities of the land use/water quality connection. The maps help to graphically and simply illustrate the concept of watersheds, the role of land use in determining water resource health, the relationship between watershed boundaries and political jurisdictions, and the location of key natural resources. Arnold emphasizes that the maps are not complicated, and are combined with local photographs and computer graphics to make them as simple and understandable as possible. The idea is catching on — adaptations of NEMO are springing up around the country.

One aspect of NEMO that really gets people's attention is the project's analysis of impervious surfaces, which is recognized as a key indicator of watershed health. NEMO conducts an impervious surface "build-out" analysis, which compares current levels to future levels projected from local zoning regulations. The difference is often startling to local officials, and can help direct changes to land use policies and management that are more protective of water resources. In partnership with The Nature Conservancy, the Environmental Protection Agency, and the U.S. Fish and Wildlife Service, the UConn NEMO team has been working on two pilot watershed projects in the lower Connecticut River valley. These projects use additional GIS data layers, like soils and parcel (property line) information, to lend more in-depth educational and analytical assistance to the watershed communities. For instance, GIS is used to target high priority large woodlot and stream side property owners for educational programs. In addition, maps of priority conservation areas and areas best suited for development are being prepared.

For more information:
contact Chester Arnold, 860-345-4511
(complete listing under Key Contacts and Resources in this lesson)

Save Our Streams volunteers working together to lay a facine in a trench. *Credit: Jay West*

Save Our Streams, Izaak Walton League

Stream Restoration Services for Local Watershed Projects

Some groups are able to get enough outside funding support that they can restore a stream with as little as $500-$1000 of their own money.

Through workshops, guides and a 1-800 number, Save Our Streams (SOS), operating out of Gaithersburg, MD, provides technical assistance on stream restoration and volunteer monitoring techniques to local watershed groups. Training is designed for all ages. SOS maintains a nationwide computer database of roughly 4,000 projects through which groups can coordinate their efforts with others. A typical hotline call might be a water watch group wanting to know techniques and plant types for restoring grass beds, plants that work well in sandy soils, and techniques for planting on steep slopes where the bank can not be graded. Save Our Streams is able to refer the caller to projects across the nation who have tackled and solved similar issues.

SOS encourages local groups to partner with federal and state agencies and private sector sponsors to bring costs down. Some groups are able to get enough outside funding support that they can restore a stream with as little as $500-$1000 of their own money. This partnering can pay off in other ways: in several states, like Virginia and West Virginia, data collected by volunteer monitors has been used in the States' official water quality reports.

The typical SOS workshop lasts 1 to 2 days and covers materials developed by SOS and others. For example, besides using the Global Rivers Environmental Education Network's teacher manual, they also use the SOS wetlands assessment handbook that they developed with the aid of citizen's groups.

Save Our Streams always takes time to learn the watershed's history before they go into a community to conduct a workshop.

Save Our Streams volunteer digging a trench for a facine. *Credit: Jay West.*

By this they mean not just the events but the culture and the people. This helps them to understand why one group of citizens may oppose another and to construct ways to build trust between them. A one size fits all national approach does not work, as each watershed is unique.

For more information:
contact the National Save Our Streams, 301-548-0150, 301-548-0146 (fax), http://www.iwla.org, 1-800-BUG-IWLA. Ask for a copy of their excellent summary of stream restoration resources.

Key Contacts and Resources

TECHNICAL ASSISTANCE

- **Watershed Protection Techniques,** periodic bulletin on urban watershed restoration and protection tools, Center for Watershed Protection, 8737 Colesville Road, Suite L-105, Silver Spring, MD 20910, 301-589-1890, 301-589-8745 (fax), http://www.pipeline.com/~mrrunoff/ Thomas Schueler, Editor-in-Chief and June Beittel, Managing Editor. Many watershed practitioners find this useful as a source of information for best management practices information and case studies. Subscriptions are $48 or $28 for students.
- **Watershed Tools Directory,** EPA 841-B-95-005, compilation by the U.S. EPA of over 200 watershed related tools. Contact: Chris Laabs, U.S. EPA, 401 M Street, S.W. 4503F, Washington, DC 20460, 202-260-7030, www.epa.gov/OWOW/watershed. See also **Compendium of Tools for Watershed Assessment and TMDL Development,** a review of watershed models and techniques, EPA841-B-97-006, available from 1-800-490-9198.
- **Watershed Academy,** watershed training for watershed managers and pointer system to other training opportunities. Contact: Doug Norton, 202-260-7017. http://www.epa.gov/OWOW/watershed/wacademy.htm, provides training for watershed managers based on local, state, tribal, and federal experiences in implementing the watershed approach throughout the past decade.
- **National Save Our Streams Resource List,** March 1997, is a very comprehensive list of stream-related conservation resources including short descriptions and contacts for ordering. Broken down into categories for easy use. IWLA, Save Our Streams, 707 Conservation Lane, Gaithersburg, MD, 20878-2983, 301-548-0150, 1-800-BUG-IWLA, savestrm@iwla.org.
- **Applied River Morphology,** Dave Rosgen, 1996, Pagosa Springs, Colorado. Guide for the classification, assessment, and monitoring for rivers and the applications for water resource management, 970-264-7100, 970-264-7121 (fax).
- **Ecological Restoration: A Tool to Manage Stream Quality,** U.S. EPA, EPA841-F-95-007, http://www.epa.gov/OWOW/NPS/Ecology/, Theresa Tuano, 202-260-7059. Call 1-800-490-9198 to order. Guide explains CWA authorities for restoration of streams, linkages with state water quality standards, and cost-effectiveness of techniques.
- **Watershed Approach to Urban Runoff: Handbook for Decision Makers,** Terrene Institute, 4-B Hebert Street, Alexandria, VA 22305, 703-548-5473,703-548-6299 (fax), www.terrene.org. In addition, the ENVIROSCAPE Watershed Model is a powerful 3 dimensional tool that many States have purchased and will loan out to watershed groups who can not afford it themselves.
- **Project NEMO,** Chester Arnold, University of Connecticut Cooperative Extension System, 1066 Saybrook Road, Box 70, Haddam, CT 06438-0070, 860-345-4511, carnold@canr1.cag.uconn.edu, www.lib.uconn.edu/CANR/ces/Nemo/ See Watershed '96 paper: **Training Local Officials in Watershed Management Using User-Friendly Geographic Information Systems,** Lorraine Joubert, Water Resource Specialist, Alyson McCann, Water Quality Coordinator, Dr. Arthur Gold, Professor, PhD, University of Rhode Island, Natural Resources Science, Kingston, RI, www.epa.gov/OWOW/watershed/Proceed/arnold.html
- **Farm-A-Syst and Home-A-Syst** - tools to help farmers and landowners determine the pollution potential of their activities and develop action plans to reduce the risk, 550 Babcock Drive B142, Madison, WI, 53706-1293, 608-265-2773, 608-265-2775 (fax), www.wisc.edu/farmasyst. Paper presented at W '96, http://www.epa.gov/OWOW/watershed/Proceed/jackson.html
- **The Freshwater Imperative: A Research Agenda,** Island Press, 1995, Island Press, Box 7, Dept., 2NET, Covelo, CA 95428 or call 1-800-828-1302 Fax orders to 707-983-6414. Establishes a research agenda for freshwater with an emphasis on watershed protection centered around three key issues: biological impoverishment, altered hydrological regimes, and risks to human health and quality of life. http://www.islandpress. com/books/bookdata/FWimp.html
- **Federal Guidance for the Establishment, Use and Operation of Mitigation Banks,** Federal Register, Vol. 60, No. 228, November 28, 1995, Contact: Thomas Kelsch (EPA), 202-260-8795 http://ceres.ca.gov/wetlands/policies/mitigation_guidance.html

PLANNING AND NETWORKING TOOLS

- **Watershed Partnership Starter Kit,** video and guides that cover the basics for developing and sustaining watershed partnerships, Know Your Watershed, Conservation Technology Information Center, 1220 Potter Drive, Room 170, West Lafayette, IN 47906, 765-494-9555, 765-494-5969 (fax), kyw@ctic.purdue.edu, http://ctic.purdue.edu/KYW/KYW.html Also, see the **Calendar of Events** and

the National Watershed Network on the same web site.

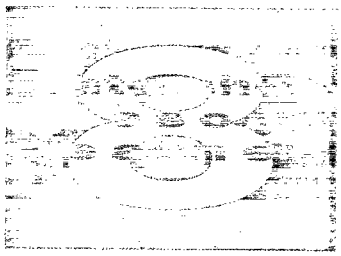
- **Water Environment Federation Technical Chat Area on Watersheds,** Watershed & Wet Weather, Range of Topics: Watershed Quality & Management, Nonpoint Source, Wetlands, Ecology, Water Reuse, Cross-Media Impacts, Biomonitoring, NPDES & Storm water Permitting, Water Quality Criteria & Standards, Modeling & Analytical Tools, Clean Water Act, http://www.wef.org/wwwboard/watershed/wwwboard.html Moderated by Greg McNelly, gmcnelly@wef.org
- **Starting Up: A Handbook for New River and Watershed Organizations,** covers the basics including by-laws and how to get grants. Watershed practitioners have found this very useful. Also, *River Voices* newsletter issues on "Say it with Pictures," "Developing Your Message," and "Media Matters" are very popular and useful (see Appendix 3). **The Watershed Innovators Workshop, June 4-5, Proceedings** includes The Swift River Principles (see Appendix 1). River Network, Pat Munoz, 4000 Albemarle St., N.W. 303, Washington, DC 20016, 202-364-2550, 202-364-2520 (fax), http://www.teleport.com/~rivernet/, Kathy Luscher, 1-800-423-6747, 503-241-9256 (fax), (rivernet@igc.apc.org), P.O. Box 8787, Portland, OR, 97207-8787.
- **Greener Thumb,** 30 minute video for homeowners to create environmentally-friendly lawn and landscapes, produced by Rutgers University Cooperative Extension Service, P.O. Box 231, New Brunswick, NJ, 08903-0231, Michael Olohan, 908-932-0640.

DATABASES AND MODELING

- **The National Water Information System — A Tool for Managing Hydrologic Data,** John C. Briggs U.S. Geological Survey, Reston, VA, Alan M. Lumb, U.S. Geological Survey, Reston, VA, paper delivered at Watershed '96. http://www.epa.gov/OWOW/watershed/Proceed/briggs.html
- **A Wasteload Allocation Modeling Tool for Watershed Management,** Wu-Seng Lung, Professor, Department of Civil Engineering, University of Virginia, Charlottesville, VA, paper presented at Watershed '96, www.epa.gov/OWOW/watershed/Proceed/lung.html
- **BASINS,** Geographic Information System application to help states and tribes evaluate existing data sources to identify water bodies that may not be achieving water quality standards. Works within IBM-compatible environment. Contact: Gerry LaVeck, US EPA, 401 M Street, S.W. 4305, Washington, D.C. 20460 202-260-7771, 202-260-9830. http://www.epa.gov/OST/BASINS/
- **Surf Your Watershed,** US EPA, 401 M Street, 4503F SW, Washington, DC 20460, Karen Klima, 202-260-7087, www.epa.gov/surf. Internet tool for managers and citizens to locate watershed information.
- **Index of Watershed Indicators Project,** Chuck Spooner, 202-260-1314, EPA's effort, in partnership with many, to describe the condition of watersheds nationally. Available at http://www.epa.gov/surf/iwiprev.html
- **Massachusetts' watershed modeling tool,** Andrew Gottlieb, MA DEP, 11 Winter St, Boston, MA 02108, 617-292-5653, 617-292-5696 (fax).
- **Watershed Planning System: A Tool for Integrated Management of Land Use and Non-Point Source Pollution** Deborah Weller, Joseph F. Tassone, Dawn M. DiStefano, and Nevitt S.Edwards, Maryland Office of Planning (OP), paper presented at Watershed '96 http://www.epa.gov/OWOW/watershed/Proceed/weller.html

FINANCIAL

- **Watershed Protection: Catalog of Federal Programs,** US EPA, EPA-841-B-93-002, March 1993, Contact: Joan Warren, 202-260-7796. Describes federal programs that provide funding or technical assistance for watershed projects. 107 pages.
- **EPA Environmental Financing Web Page,** http://www.epa.gov/efinpage/efptools.htm This page includes guidebooks on traditional and alternative financing tools. Note: EPA grants information web page is located at http://www.epa.gov/ogd/grants.htm Includes information on EPA's wetlands grants, nonpoint source grants, and National Estuary grants. Also, visit the page on tools to finance community-based environmental protection at http://www.epa.gov/efinpage/guidebk/sec8.htm The Clean Water State Revolving Fund Program has been made more flexible to allow states to focus on their highest-priority issues, 202-260-7359, http://www.epa.gov/efinpage/srfcon.htm.
- **Financing Marine and Estuarine Programs: A Guide to Resources,** September 1988, EPA503/8-88/001, Contact: Joe Hall, 202-260-9082. Order from 1-800-490-9198.



Measure, Communicate, and Account for Progress

Having systems in place to measure and communicate progress is a critical part of watershed work. Appropriate measures not only keep watershed issues on people's radar screens, but, as they are met, allow stakeholders to share successes and to highlight new challenges to the watershed.

Progress can be measured in many ways and communicated through meetings, brochures, internet sites, annual reports, news releases, and other ways. The important thing is to make sure that the appropriate measures of progress (often referred to as indicators) are selected and that information on these indicators is shared with relevant stakeholders. Measurements of progress should be associated with achieving goals set for the watershed effort (see Watershed Lesson #1). Depending on the goal, groups may choose water quality measurements (e.g., dissolved oxygen, bacteria levels, fecal coliform) or less directly water-quality based results (e.g., number of trees planted, number of watershed groups in a state, pounds of trash collected, number of canoe rentals, number of miles protected from erosion).

To make sure that progress does indeed occur, most watershed groups spell out who is responsible for what in their watershed plans. Some go so far as to establish agreements that commit groups to certain actions within certain time frames. Spelling this out can help with accountability.

In terms of groups to whom progress should be communicated, county commissioners, elected local and state officials, watershed residents, and major companies in the watershed are at the top of the list for most watershed practitioners. Over time, as updates on progress are made, practitioners have found that some constituencies will begin to ask for them — a sign that awareness has been raised.

Tennessee Valley Authority

Data Collection is Not Enough

"The Tennessee River is Tennessee Valley Authority's (TVA) special responsibility and reason for being. The people of our region expect us to serve as the river's manager and caretaker."

According to Wayne Poppe of the Tennessee Valley Authority's Clean Water Initiative, that acknowledgment of stewardship drives the organization's commitment to accountability through good stakeholder communication.

The "front lines" of interaction with the public are TVA's River Action Teams — water resource professionals and education specialists assigned to work in specific watersheds across the Tennessee Valley. Their mission is to build partnerships with local residents, business and industry, and government agencies and to foster public responsibility for watershed protection and improvement. TVA's watershed management strategies for individual hydrologic units all across the Tennessee Valley are based on both a scientific assessment of resource needs and an assessment of local

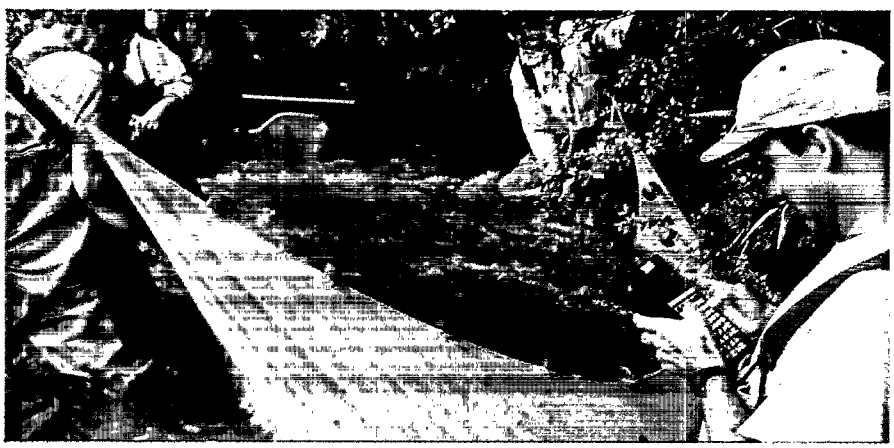
The objective is to make sure water resources are in good enough condition to provide the benefits important to local citizens.

community needs. The objective is to make sure water resources are in good enough condition to provide the benefits important to local citizens. Team members work side-by-side with watershed residents to accomplish these objectives, and Poppe feels this partnership approach is critical: "Our on-going presence in the field is a key component of our efforts to establish the dialogue that will help to improve and protect the river. No matter how good we

TVA's River Action Team performing a quick diagnosis of water quality. *Credit: Tennessee Valley Authority.*

are at data collection and reporting, we ultimately miss the mark if we fail to provide this interaction with the river's users."

Telling the story is important too. Communication products that illustrate progress achieved should be tailored to fit the audiences they're trying to reach. As an example, a new series of attractive and user-friendly watershed brochures profile the ecological health of TVA's lakes by reporting on the condition of five indicators or "vital signs" — chlorophyll, oxygen, fish, bottom life, and sediment. The brochures can be used by watershed residents to track changing conditions, as well as to identify areas where further cleanup and protection must occur. Ratings for ecological health indicators are color-coded onto an easy-to-read map of the watershed, allowing residents to see at a glance what conditions are like in the lakes that matter most to them. The information in the brochures is presented with a river user's perspective in mind, taking into account the varied interests of local residents — everything from whether it's safe to eat the river's fish or swim in the lake. Far more than just a "report card" on ecological health, the brochures serve to raise awareness among watershed residents about local water quality issues and to channel that new understanding into support and involvement in improvement and protection efforts.



Using a technique known as rapid bioassessment, TVA's River Action Teams can take a quick 'snapshot' of a stream's condition, performing a quick diagnosis of water quality concerns and thus ensuring a faster path to treatment. *Credit: Tennessee Valley Authority.*

Poppe believes there are some fundamental aspects of measuring progress: "Accurately monitoring conditions in the watersheds. Reporting on the types of things that are meaningful to the public. Effectively communicating both progress and the need for improvement. Helping watershed residents use this information to make changes that will ultimately lead to the fulfillment of their goals for the river's use. That's the kind of accountability that can serve as a benchmark for substantive, long-term improvements in water quality."

For more information:
contact Wayne Poppe, 423-451-7333, 423-751-7648 (fax)

Brazos River Authority, Texas

Progress Doesn't Happen Overnight

Tom Conry, from the Brazos River Authority in Texas, stresses that the results of watershed work do not come about over night. It may take 5 to 10 years of sharing information to achieve substantial progress. For example, in the Oyster Creek watershed, data collected by volunteer monitors was shared with industry and others in the community. The data suggested an impact on the system by the industry's discharge. After working together for two years, industry came to understand that they were impacting the stream. Similarly, the monitors realized that industry was only responsible for part of the problem: non-point source pollution was responsible for up to 50 percent.

Industry decided to re-engineer their discharge system to remedy the situation when they realized that (1) the data was good and (2) the monitors were not pointing fingers exclusively at them. As a result, the partnership has continued to grow. In fact, the industry has supported the volunteer monitors with chemical supplies and monitoring kits. In addition, they are

Oyster Creek water quality monitors Judy Cole and Donna Phillips out on the job.
Credit: Provided by Colleen Spencer, Oyster Creek Community Led Environmental Action Network.

funding a constructed wetlands pilot project. The key, Conry believes, is to keep key constituencies aware of progress as its made in the watershed and to say thank you as little successes occur.

For more information:
contact Tom Conry, Brazos River Authority, 817-772-6010, 7935 (fax), tomco@brazos.org

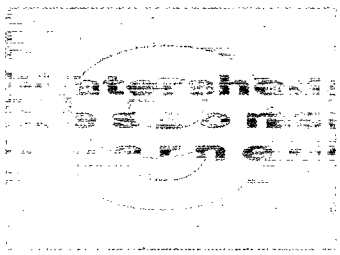
Key Contacts and Resources

PAPERS THAT ADDRESS ACCOUNTABILITY IN WATERSHEDS

- **Addressing Barriers to Watershed Management,** Robert W. Adler, Associate Professor University of Utah College of Law, Salt Lake City, UT, paper delivered at Watershed '96, http://www.epa.gov/owow/watershed/Proceed/adler.html. See **Journal of Environmental Law** for complete article, 25 Environmental Law 973-1106 1995.
- **Clean Water Act Problems and Watershed Solutions,** Katherine A. O'Connor, A.I.C.P., Health and Regulatory Specialist, Orange County Water District, Fountain Valley, CA, paper delivered at W'96, http://www.epa.gov/owow/watershed/Proceed/oconnor1.html
- **Watershed Education and Restoration,** Dean Grover, Forest Fisheries Biologist, Ochoco National Forest, Prineville, OR, David A. Nolte, Bring Back the Natives Project Coordinator, Trout Unlimited, Redmond, OR, paper delivered at Watershed '96, http://www.epa.gov/owow/watershed/Proceed/grover.html
- **Indicators of International Progress,** Ethan T. Smith, Supervisory Hydrologist, U.S. Geological Survey, Reston, VA, Martin P. Bratzel, International Joint Commission, Windsor, Ontario, Canada paper delivered at Watershed '96, http://www.epa.gov/OWOW/watershed/Proceed/smith_et.html
- **Maryland's Tributary Strategies: Statewide Nutrient Reduction Through a Watershed Approach,** Lauren Wenzel, Roger Banting, and Danielle Lucid, Maryland Department of Natural Resources, Annapolis, MD paper delivered at Watershed '96, http://www.epa.gov/OWOW/watershed/Proceed/wenzel.html

WATERSHED GOALS AND INDICATORS

- **Developing an Applied System of Ecological Indicators for Measuring Restoration Progress in an Urban Watershed,** Andrew Warner, Hydrologist, Metropolitan Washington Council of Governments paper delivered at Watershed '96, http://www.epa.gov/OWOW/watershed/Proceed/warner.html
- **Water Works: Your Neighbors Share Ideas on Working in Partnership for Clean Water,** Tennessee Valley Authority, March 1997. Useful guide. Kathleen O'Brien, editor, 423-632-8502, 423-632-3188 (fax). See story of Linda Hixon. **Tennessee Valley Authority, Lake and Stream Condition Watershed Brochures,** Wayne Poppe, 423-451-7333, 423-751-7648 (fax)
- **Index of Watershed Indicators Project,** Chuck Spooner, 202-260-1314, EPA's effort, in partnership with many, to describe the condition of watersheds nationally. Available at http://www.epa.gov/surf/iwiprev.html
- **Water Quality Indicator's Guide: Surface Waters,** Second Edition, Soil and Water Conservation Society, 7515 Northeast Ankeny Road, Ankeny, IA 50021-9764, 515-289-2331, http://www.swcs.org/books.htm, easy-to-follow process to check local lakes and streams
- **Environmental Indicators of Water Quality in the United States, EPA841-R-96-002 and Environmental Indicators of Water Quality in the United States Fact Sheets** EPA841-F-96-001, June 1996, http://www.epa.gov/OW/indic/, available for free by calling 1-800-490-9198. Short reports describing the water quality in the United States using a set of 18 environmental indicators that measure progress toward national water goals and objectives. Contact: Sarah Lehmann, 202-260-7021.



Education and Involvement Drive Action

"Education can help create support for the watershed effort...landowners would have been more receptive to the watershed effort and more involved in projects if there had been better education."

— The Watershed Source Book, University of Colorado Natural Resources Law Center, 1-43

Earth Day, 1970, and the resulting actions taken by government demonstrated that public support is the engine that drives protection of the environment. But public support depends upon public awareness, involvement, and education. Watershed awareness campaigns and education programs can help people who live, work, and recreate in a watershed understand what the problems are and how they can help remedy them. Based on lessons learned by watershed educators, effective watershed communication involves:

understanding one's audience, being careful with terms, and knowing how the target audience likes to receive its information. Further, one should be ready to explain how that particular audience can help remedy the problems - what actions they can take.

When it comes to creating awareness in the general public, watershed coordinators have used many different mechanisms, including highway signs, bumper stickers, billboards, awards, field trips, newsletters, and newspaper inserts as well as cutting edge approaches such as the internet. A large number of people have also been reached through public service announcements, license plates, storm drain stenciling, peer to peer communication, and community events.

Educating a community for the purpose of stimulating voluntary action means targeting groups from all walks of life: farmers, businessmen, school children and teachers, local government officials, homeowners, and the like. Well designed education programs can lead to tangible results, especially when they get participants out in the field, are delivered in an effective way, and encourage action and reflection. Some local watershed groups have had a lot of success in awarding small contracts to key constituency groups under which they themselves are charged with carrying out education programs. Such programs have been quite effective in encouraging the voluntary adoption of best management practices.

Watershed practitioners have learned that who delivers the information is important, as well. In general, peer to peer communication or communication by a neutral source is best. Community members, such as students, are often better received than a government official.

Lake Pontchartrain Basin Foundation, Louisiana

Alligators Are Part of the Lesson Plan

Anne Rheams, Education Coordinator of the Lake Pontchartrain Basin Foundation, has developed a strong education/outreach program which consists of field trips, festivals, videos, and an excellent curriculum guide. Based on her experience, she believes that getting people out in the field is the key component of watershed education.

Students have stenciled storm drains to educate citizens about the biggest source of pollution in the watershed, urban runoff.

The Foundation does a lot of work with inner city children, who have very little experience with nature. "When they see a wetland system for the first time," Rheams says, "they are a little scared

This student had never touched a fish before her trip to the wetlands in the Lake Pontchartrain Watershed.
Credit: Lake Pontchartrain

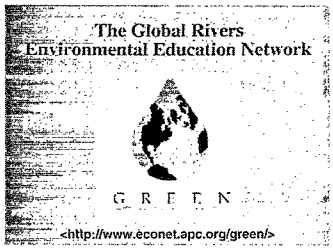
and think that an alligator will eat them. However, over time, they come to understand that wetlands are beautiful systems that need to be protected."

The Foundation's work has also led to action. For example, Holy Cross High School students have pulled together a collection center where residents can bring their empty oil cans for recycling. In addition, students have stenciled storm drains to educate citizens about the biggest source of pollution in the watershed, *urban runoff.*

A key component of the Foundation's education effort is a curriculum guide, "Lessons on the Lake," designed specifically for Lake Pontchartrain. In developing the guide, the Foundation assembled a group of teachers to advise them on how to best reach youth ages 4-18. Every effort was made to assemble the best and most committed teachers — one of them, Sue Ellen Lyons, was selected in 1996 to receive the National Wetlands Award for her outstanding work. Most importantly, the curriculum accounts for the different ways that youth learn: some through visual means, others through music, and still others through touch or action.

Another component of the Foundation's outreach effort is a grants program under which teachers can receive up to $500 for implementing watershed projects in their classrooms. The Foundation has also awarded a grant to the Louisiana Children's Museum for an exhibit on the impact of urban runoff on the lake. An estimated 225,000 people visit this local museum annually.

For more information:
contact Anne Rheams, 504-836-2238, 504-836-7283 (fax)



GREEN nurtures volunteer student action to protect watersheds.
Credit: Provided by GREEN

Raising Awareness in the Community

Students Travel Down the Kingfisher Canoe Trail

In addition to carrying out less strenuous awareness raising activities (such as slide shows), the Anacostia Watershed Society offers a "Day on the River" learning program to Washington, D.C. metropolitan area youth. The watershed covers 170 square miles and includes portions of two

Local students enjoy a day on the Anacostia featuring a canoe trip where they get hands-on exposure to their watershed. Many learn for the first time the value of the resource.
Credit: Provided by the Anacostia Watershed Society.

Maryland counties as well as the eastern half of the District of Columbia. In 1996, 374 students from eight different schools in the watershed took part in the program.

"Day on the River" begins with an introductory slide presentation. Students then embark on a five mile canoe trip down the Anacostia's "Kingfisher Canoe Trail." They disembark twice along the way, at the recently restored 60 acre Kenilworth wetland and at the National Park Service's Kenilworth Aquatic Gardens. Here, they engage in identifying the flora and fauna and in monitoring water quality. They discuss their observations with the group and consider what effects land use practices have had on the river. Journal writing is featured during the expedition.

The program provides teachers with classroom follow-up activities that reinforce lessons learned on the river. Both classroom and outdoor activities are designed to exercise students in science, math, English, and history, as well as introduce them to the principles of ecology and watershed protection. The program emphasizes the student's connection to the natural world — how lifestyle choices affect the environment, and how the environment, in turn, affects their neighborhood and quality of life.

Both classroom and outdoor activities are designed to exercise students in science, math, English, and history.

For more information:
contact Anacostia Watershed Society, 301-699-6204, 301-699-3317 (fax), http://www.anacostiaws.org

Students Taking Action in Detroit

GREEN Students Uncover a Malfunctioning Pump

Volunteer monitoring presents a great opportunity for people of all ages to learn more about their watershed. Students in the Global Rivers Environmental Education Network (GREEN) program at North Farmington High School near Detroit analyzed data that they and students from other schools had collected and discovered bacterial contamination down river from a city sewage pumping station. They presented their findings to the City Engineer, who then took action — he repaired a malfunctioning pump. The students not only honed their skills in various disciplines, such as language arts, civics, science, and math, but they linked data to a process for effective problem-solving.

For more information:
contact David Schmidt, GREEN, 313-761-8142, 206 South Fifth Avenue, Suite 150, Ann Arbor, MI 48104, www.econet.apc.org/green/

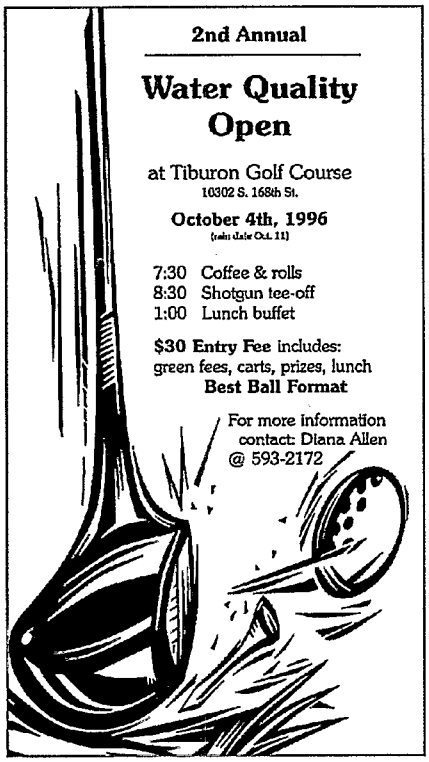
Tiburon Golf Course, Omaha, Nebraska

Novel Approach to Reach Busy People

The Wehrspann Lake Watershed Project has organized several "Water Quality Opens" at a local golf course in Omaha, Nebraska. Entrants enjoy 18 holes of golf for a modest fee while learning about measures the golf course is taking to protect water quality in the Lake and about related steps being taken elsewhere in the watershed.

Clergy, elected officials, farmers, and developers overwhelmingly expressed a desire to leave the cattails in place.

Water Quality is central to the theme of each tournament, and golfers engage in active learning exercises as they make their way around the course. For example, prizes are given to those who drive their ball closest to, but not into, the water. Golfers are also provided with a list of "10 Things Golfers Can Do To Help."



Golf tournament draws people from all walks of life for a day of fun and education about their watershed. *Credit: Provided by Diana Allen, Lower South Platte River Natural Resources District*

A unique educational feature of the tournaments lies in the fact that people from all walks of life are brought together in a casual environment that is also conducive to learning about nonpoint source pollution. The 48 participants are scrambled into teams, thereby facilitating interaction among the broad spectrum of professionals who participate: clergy, attorneys, elected officials, farmers, developers, engineers, and government employees.

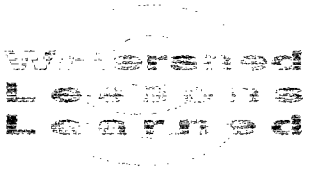
At the end of each tournament, golfers were asked to complete a simple questionnaire. In 1996, 64 percent of respondents were able to list something new they had learned about water quality as a result of playing in the tournament, and 88 percent were able to correctly identify a source of nonpoint source pollution and a prevention method. The tournaments also helped to stimulate discussions between the golfers and the golf-course superintendent about management practices. In 1995, golfers were asked how to solve the "perceived" cattail overpopulation; they overwhelmingly expressed a desire to leave the cattails in place, thus recognizing their water quality benefits.

For more information:
contact Diana Allen, Lower Platte South Natural Resources District, 3125 Poria Street, Box 83581, Lincoln, NE 68501-3581, 402-476-2729, 402-476-6454 (fax), dallen@nrdec.nrc.state.ne.us.

Key Contacts and Resources

FINANCIAL SUPPORT

- **National Fish and Wildlife Foundation,** 1120 Connecticut Ave., NW, Suite 900, Washington, DC 20036, 202-857-0166, 202-857-0162 (fax), www.nfwf.org. Contact: Kathleen Pickering. Since 1990, this group has invested more than $1 million in federal matching funds toward formal and informal watershed education programs for youth, teachers, and other community members. They also hosted in 1996 Watershed Education: Goals and Strategies for Training,



Communication and Partnerships where approximately 60 key watershed educators gathered. Summary of session is available.

- **National Environmental Education and Training Foundation,** uses federal funds to award one-year competitive challenge grants for environmental education projects that are scientifically and educationally valid; permanently improve a grantee organization's ability to achieve its mission; and work through broad-based public/private partnerships. The program is currently focused on public health, safe water, and environmental education excellence. In the area of water, The Foundation supports environmental education projects that help people make the connection between their water source and their water faucet. Programs that promote community-wide understanding of water sources, quality, treatments, protection strategies, costs, options are a priority. The Foundation annually awards $500,000 - $600,000 in matching grants. Kevin Coyle and Michelle Harvey, 734 15th Street, N.W. Suite 420, Washington, D.C. 20005-1013, 202-628-8200, 202-628-8204 (fax). Note: Kevin Coyle was the principal author of the Swift River Principles (see Appendix 1).

CURRICULUM AND ACTIVITY GUIDES

- **Lessons on the Lake: An Educator's Guide to the Pontchartrain Basin** is a good example of a locally-based education guide — grades 5-12. Developed by Lake Pontchartrain Basin Foundation, Three Lakeway, Suite 2070, 3883 N. Causeway Boulevard, P.O. Box 6965, Metaire, LA 70009-6965, 504-836-2238, 504-836-7283 (fax), Anne Rheams, Education and Outreach Coordinator.
- **Project WET Curriculum and Activity Guide,** 201 Culbertson Hall, Montana State University, Bozeman, MT 59717-0570, Dennis Nelson, Director, 406-994-5392, 406-994-1919 (fax), http://www.montana.edu:80/wwwwet/. **Discover a Watershed: The Everglades** is the first in a series of curricula and associated workshops developed specifically for major North American watersheds.
- **Sourcebook for Watershed Education** contains examples of watershed curricula as well as select watershed activities from across disciplines. It is based on the collective experience of watershed educators and community leaders from five watershed education programs. Developed by Global Rivers Environmental Education Network, 206 South Fifth Avenue, Suite 150, Ann Arbor, MI 48104, www.econet.apc.org/green/ 313-761-8142.
- **Adopt-A-Watershed,** P.O. Box 1850, Hayfork, CA, Kim Stokely, 916-628-5334, 916-628-4212 (fax). www.tcoe.trinity.k12.ca.us/aaw/adopt.html. Science-oriented curriculum for k-12 using all aspects of the local watershed as a classroom. Encourages community action projects including field studies and restoration.
- **Educating Young People About Water: A Guide to Goals and Resources** includes 100 reviewed youth water education curricula. The guide along with 2 other resources are found on the World Wide Web at www.uwex.edu/erc/ywc, and searchable by water topic. University of Wisconsin, 216 Agriculture Hall, 1450 Linden Drive, Madison, WI 53706, 608-262-2031 (fax), erc@uwex.edu, 1-800-WATER20, Elaine Andrews or Kelly J. Warren, 608-262-0142.

VOLUNTEER MONITORING

- **A Citizen's Streambank Restoration Handbook** is available for $15.00. http://www.iwla.org/iwla/jump6/index.html Developed by Save Our Streams, Izaak Walton League, 707 Conservation Lane, Gaithersburg, MD 20878-2983, Karen Firehock, 301-548-0150, 301-548-0146 (fax). Also, see their macro invertebrate on-line resource. Kids love it! Click on "The SOS Macro Invertebrate" Key.
- **National Directory of Volunteer Environmental Monitoring Programs,** US EPA, January 1994, EPA 841B94001. Available on the internet at http://www.epa.gov/OWOW/monitor/dir.html or from NCEPI at 1-800-490-9198. See Appendix 3 for information on Volunteer Monitor newsletter. School-based monitoring issue from Spring 1993 was very popular. Alice Mayio, EPA, 202-260-7018. http://www.epa.gov/owow/monitoring/volunteer/vm_index.html

EDUCATIONAL TOOLS

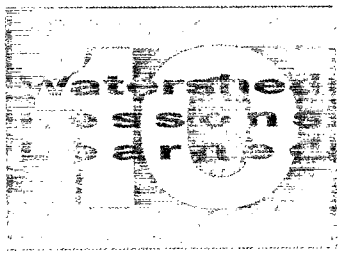
- **Water Quality Standards Academy,** key educational workshop that helps managers, staff, and citizens understand the cornerstone authority of the Clean Water Act. Contact: Frances Desselle, 202-260-1320, desselle.frances@epamail.epa.gov Note: 10+ videos have been developed on various aspects of water quality standards and are available on loan from the EPA Water Resource Center, 202-260-7786. The one on wetlands is available from the EPA Wetlands Hotline at 1-800-832-7828.
- **Surf Your Watershed,** US EPA, 401 M Street, 4503F SW, Washington, DC 20460, Karen Klima, 202-260-7087, www.epa.gov/surf. Internet tool for managers and citizens to locate watershed information.
- **Terrene Institute Environmental Products Catalog,** 4 Herbert Street, Alexandria, VA 22305, Judy Taggart, 703-548-5473, 703-548-6299 (fax), www.terrene.org contains many useful watershed-related outreach items including a Citizen's Guide to Watershed Protection and the popular ENVIROSCAPE table-top watershed education model (many States have purchased and lend this out to watershed groups).
- **USGS Water Poster Series,** Box 25046, MS 406, Denver, CO, 80225, Steve Vandas contact, http://h20.usgs.gov/public/outreach/OutReach.html, 303-236-5950 x221, good education tool for grades k-8. Developed in partnership with the National Science Teachers Association.
- **What is a Watershed?** NRCS Program Aid 420. Call 1-800-THE-SOIL to obtain a copy. Watershed practitioners have found this piece useful in explaining the basics of watersheds.
- **SPLASH** CD ROM, interactive, multi-media educational tool on nonpoint source pollution.

Includes "voices of the community" and allows users to enter urban, rural, and suburban environments and see the difference between when it rains with and without best management practices in place. Produced by Diana Allen, Lower Platte South Natural Resources District, 3125 Poria Street, Box 83581, Lincoln, NE 68501-3581, 402-476-2729, 402-476-6454 (fax), dallen@nrdec.nrc.state.ne.us.

- **Farm-A-Syst/Home-A-Syst,** Gary Jackson, 550 Babcock Drive B142, Madison, WI, 53706-1293, 608-265-2773, 608-265-2775 (fax), http://www.wisc.edu/farmasyst/, self-assessment programs for homes and farmsteads. Most states have modified the program for their purposes.
- **National Watershed Library** - lists many education, outreach and resource tools for specific audiences like teachers, farmers and homeowners. http://www.ctic.purdue.edu/KYW/KYW.html
- **Project NEMO** (Nonpoint Education for Municipal Officials) uses GIS technology to educate landowners and municipal officials about nonpoint source pollution and watershed protection. University of Connecticut Cooperative Extension, Chester Arnold, 1066 Saybrook Road, Box 70, Haddam, CT 06438-0070, 860-345-4511, 860-345-3357 (fax), www.lib.uconn.edu/CANR/ces/nemo/
- **Getting in Step: A Pathway to Effective Outreach in Your Watershed,** workshop that provides the building blocks to develop an outreach strategy, tips and tools to produce eye-catching materials, and methods to effectively use the media to get your message out. Kristen Martin, U.S. EPA, 401 M Street, S.W., 4503F, Washington, D.C., 202-260-7108.

MODEL PROGRAMS

- **Anacostia Watershed Society Web Site,** Robert Boone, Executive Director, http://www.anacostiaws.org, 301-699-6204, 301-699-3317 (fax), good example of a local outreach program.
- **Water Works: Your Neighbors Share Ideas on Working in Partnership for Clean Water,** Tennessee Valley Authority, March 1997. Useful guide. Kathleen O'Brien, editor, 423-632-8502, 423-632-3188 (fax). See stories of Brad Bole and Peg Beute.
- **Watershed Restoration: A Guide for Citizen Involvement in California,** December 1995, US Department of Commerce, National Oceanic and Atmospheric Administration, Coastal Oceans Office, 1315 East West Highway, Silver Spring, MD 20910, 301-713-3338, 301-713-4044 (fax). While developed for California, this well-constructed guide may spark ideas for other watersheds.
- **Educating for Action: More Success Stories from Puget Sound,** June 1993, Puget Sound Water Quality Action Team, P.O. Box 40900, Olympia, WA 98504-0900 (1-800-54-SOUND). Describes many education success stories funded through the Public Involvement and Education program where small contracts were awarded to community groups to undertake education. Includes description of products, target audience, and results. Well organized and very helpful for prompting ideas. Contact: Kathy Minsch, 360-407-7320, 360-407-7333 (fax).
- **Chesapeake Bay Communities: Making the Connection, A Catalog of Local Initiatives to Protect and Restore the Chesapeake Bay Watershed,** EPA 903-R-95-108, April 1996, presents any outreach examples including "Landscapes" Public Awareness Program in Chester County Pennsylvania where public opinion was solicited regarding the issue of sprawl. The results showed an overwhelming desire to change the current pattern of sprawl. 1-800-YOURBAY.
- **Nonpoint Source Pollution Information/Education Programs: National Conference** Proceedings, October 22-24, 1996, includes over 30 papers many of which include lessons learned. Copies of proceedings can be obtained from Illinois Environmental Protection Agency, Division of Water Pollution Control - Planning Section, P.O. Box 19276, Springfield, Illinois 62794-9276, 271-782-3362, 217-785-1225 (fax).
- **Groundwater Guardian** focuses on recognizing community efforts to protect the resource. Started in 1994, and as of June 1997, had 173 communities in 43 states participating. Developed by the Groundwater Foundation whose goal is to educate and motivate people to care about and for groundwater and watersheds. They have activity and community guides related to groundwater, Susan Seacrest, President, P.O. Box 22558, Lincoln, NE 68542, 402-434-2740, 402-434-2742 (fax), www.groundwater.org Email: info@groundwater.org See **"Developing a Results-Oriented Approach For Water Education Programs"** published in the Journal of American Water Resources Association, April 1997, Volume 33, Number 2.



Build on Small Successes

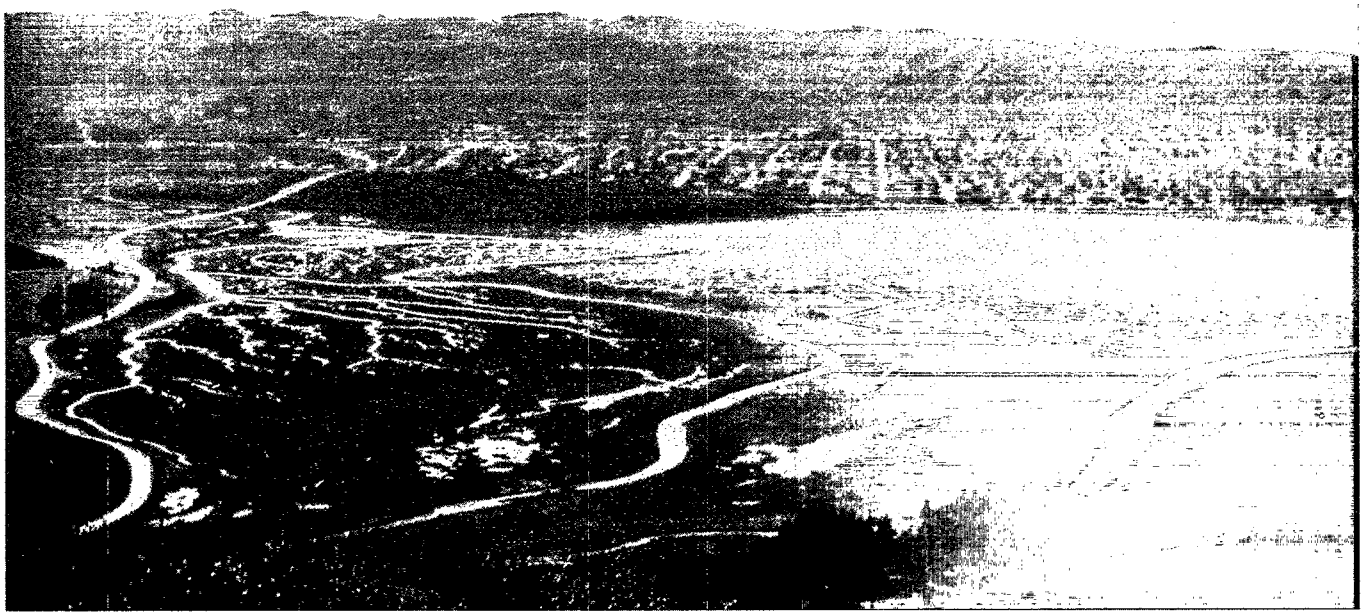
Small successes fuel future, larger ones. It is important, according to watershed practitioners, to start small and demonstrate success before working on a larger scale. For this reason demonstration projects are often a popular choice in watershed work. In some states, small victories have been instrumental in prompting the implementation of the watershed approach statewide.

Morro Bay, California

Where Starting Small Has Paid Off

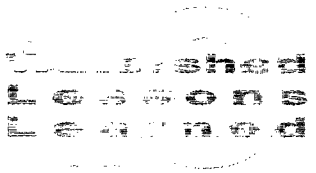
Carol Arnold, with the California State Coastal Conservancy, went to work to protect Morro Bay back in 1986 after becoming aware that the community perceived the Bay to be threatened by erosion and sedimentation. A previous study sponsored by the San Luis Obispo County had also identified this problem, but the study like most of its kind received little attention. However, it was clear that resource managers, politicians, and citizens were concerned that the Bay was filling and becoming shallower, which eventually would be detrimental to navigation, tourism, migratory birds, endangered species, and the surrounding community.

The Conservancy started small by talking to citizens about the resource. Long time residents in the community explained how parts of the back Bay had once been open water but were now becoming increasingly terrestrial. As a way to respond to their concerns, the Conservancy, the State Coastal Commission, and the County hosted a forum at which approximately a hundred politicians, government professionals, environ-



Delta and wetlands of Morro Bay. Rapid sedimentation from upstream land uses is causing these important wetlands to disappear.
Credit: Jeff Haltiner—Phillip Williams & Assoc.

Commitment to the watershed is key, and a small group's passion for its improvement can catch fire. Practitioners also say over and over that it's important to "Celebrate Success" as it occurs.



mentalists, and business people gathered to discuss the Bay. The consensus of the participants was that, while there were many issues of concern such as public access, water quality, and development, the predominant concern was sedimentation.

Given this focus, the Conservancy went to the Coastal San Luis Resource Conservation District and entered into a six year partnership to reduce sedimentation of Morro Bay. The District worked with landowners to manage grazing through the use of fences, to plug gullies, and to implement rotation systems so that no one area was overgrazed. The Conservancy with matching funds from other farmers and the Natural Resource Conservation Service paid for these improvements. The Conservancy also secured the assistance of a technical consultant who found that the average loss of open water over the past 100 years had been 25 percent overall and 60 percent in some parts with critical habitat. This was 3 to 4 times the normal rate of filling. Responding to these findings, the Conservancy issued a grant to the Resource Conservation District, who worked with the Natural Resources Conservation Service to analyze the erosion problem and to help remedy it.

The Conservancy then turned its attention to restoring the floodplain in the lower drainage areas and to restoring habitat. With the help of the Coastal Conservancy, the Resource Conservation District purchased agricultural land in the lower watershed and is in the process of restoring parts of the floodplain to its natural condition.

So much interest grew out of these activities that local residents decided to apply to become part of the National Estuary Program.

At the same time, the Conservancy was helping to organize groups to increase community awareness, education, and involvement. Friends of Morro Bay was established for advocacy, the Morro Bay Foundation was founded for research and education, and a Morro Bay Task Force was set up to help involve local residents. So much interest grew out of these activities that local residents decided to apply to become part of the National Estuary Program. In the early 90's, a local assembly person helped get the bay designated as a "State Estuary," and shortly thereafter the Bay was accepted into the National Estuary Program.

Carol Arnold believes that part of the reason for Morro Bay's designation was strong community involvement. She believes that it's important to have the support build up from the community and not be imposed from the outside. In addition, she believes that it's important to focus on manageable issues that are meaningful to people and provide a focal point around which action can occur. Over time, other issues can be addressed after a commitment and networks have been established.

For more information:
contact Carol Arnold, 510-286-4173, California Coastal Conservancy

Lower Paint Creek Association, West Virginia

It's Amazing What A Small Number Can Accomplish

The first clean-up that Dwight Siemiaczko, President of the Lower Paint Creek Association in West Virginia (he is also a miner), ran involved only five or six people. Despite the small turnout, it was a huge success. The West Virginia Division of Environmental Protection was a partner; the fee they paid for the tipping at the land fill was critical.

The word got out about the first clean up, and by the time the Association hosted its fifth one 25 people participated and 600 tons of trash were collected. A key to their success is the fact that they built incremen-

tally, had strong leadership, and were passionate in their effort. Rather than tackling the entire 43 mile stretch of river, which would in Dwight's eyes have set them up for failure, they focused initially on the lower 14, with the intention of moving up incrementally over time.

The work of the Association has stimulated the interest of other groups.

learned, Dwight has come to believe that financial and other support by government is critical to advancing local watershed programs; no one can do the job alone.

For more information:
contact Dwight Siemiaczko, 304-595-3325, 304-595-3325 (fax), 5pole@citynet.net or Pete Pitsenbarger, Chief, Office of Abandoned Mine Lands and Reclamation, West Virginia Division of Environmental Protection, 304-759-0521.

Over 240 tons of solid waste was collected during the 1996 Back Yard Clean Up drive. 57 tons were recyclable. *Credit: Provided by Dwight Siemiaczko, Lower Paint Creek Association.*

For example, a local High School wood shop class has developed signs to post throughout the watershed. The U.S. Department of Interiors Office of Surface Mining has invested $325,000 to clean up a tributary, which will result in $2.3 million annually in added fishing revenues - an amazing return for the investment. As for lessons he has

Santa Ynez Watershed

The Willow War is Only One of the Conflicts

Carolyn Barr with the Land Trust for Santa Barbara County tells this story of an unsuccessful watershed planning effort.

Along the Santa Ynez River, farmers who grow vegetables and flowers in the rich soils of the floodplain have been pleading with the county for flood control. They fear that the river may jump its banks because dense growths of willows impede peak storm water flows. The county says that it cannot help unless it receives funds to mitigate the riparian habitat damage that would occur if the willows were removed or cut back. The willow war is only one of many conflicts in the 900 square mile Santa Ynez River watershed.

It soon became clear that we were rowing upstream in a class-five rapid without a paddle.

In 1994, politicians, planners, and farmers enlisted the Coastal Conservancy's help in resolving the flood control issue. The Conservancy agreed, on condition that the problem be considered within a watershed-wide plan. They invited the Land Trust to coordinate the planning process.

"Our naive notion was that we could get everyone with a stake in watershed issues to listen to each other, study the issues, and eventually come to understand that all would

benefit from a resolution. But as property rights advocates, farmers, environmentalists, and resource agency staff sat down together, it soon became clear that we were rowing upstream in a class-five rapid without a paddle. The three sponsoring agencies - the California Coastal Conservancy, the U.S. Environmental Protection Agency, and Santa Barbara County - and the project manager pulled the plug on the project at the fourth steering committee meeting, in February 1996, less than a year after the process began.

"We realized that we had not done enough groundwork and were proceeding on the mistaken assumption that there was broad support for a watershed plan. On the Santa Ynez, no single problem required watershed-wide attention. The need for planning was apparent only to farmers on the main river channel, and to a handful of others who were losing acreage to unstable stream banks and gully erosion. The fatal mistake we made was in rushing the process and telling the landowners, water districts, and special interest groups that they were going to have to work together and develop a watershed plan. We did not take the time to understand their interests and fears, and we tried to impose a process that was not appropriate for the place and time."

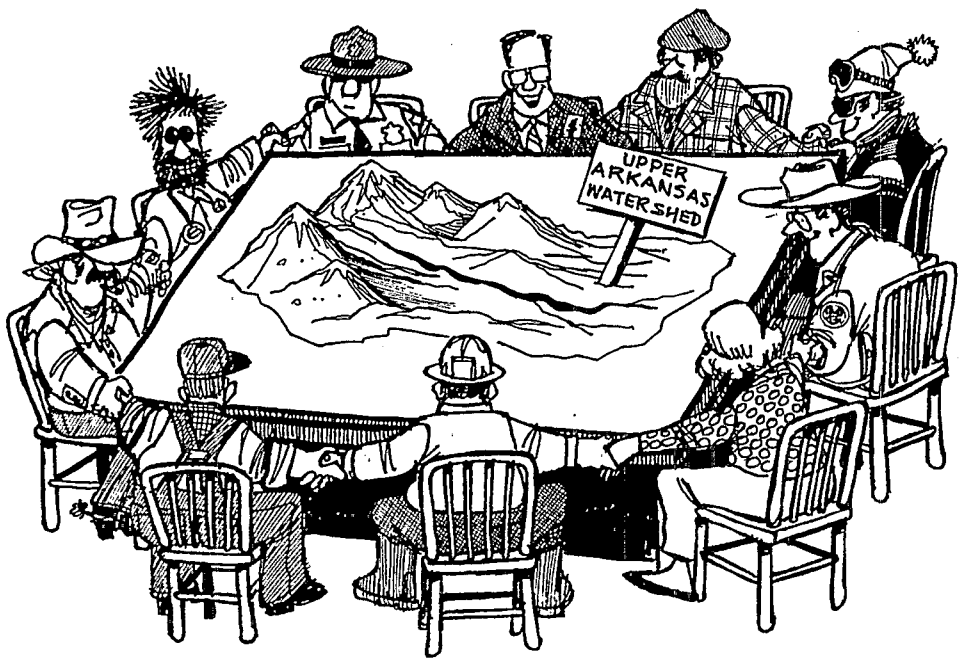
For more information:
contact Reed Holderman, 510-286-4183, rholderman@igc.org (See Appendix 1 for Lessons Learned).

Upper Arkansas Watershed Council, Colorado

Can a Citizen's Law Seminar Get the Ball Rolling?

Having a wide diversity of interests represented in a watershed organization is good. Being inclusive and open is necessary. Operating with a consensus-based decision-making process honors everyone. As important as all these things are, they often limit what can actually be done by a watershed group. Education-related projects often provide the first easy step that sets the foundation for trust and group cohesion.

The Upper Arkansas Watershed Council in Colorado is made up of 25 organizations with very different values regarding the use of water. There are historic conflicts between these groups that are deeply rooted in these value differences. During their planning process, the Council brainstormed and scored a wide array of possible actions. To no great surprise, the highly contentious



The Upper Arkansas Watershed Council uses this cartoon as a fun way to symbolize the broad-based nature of their watershed protection effort. *Credit: Rod Pudim and Jim Dickson, artists. Forwarded by Jeff Keidel.*

issues scored low, while the education items scored high.

One of the first agreed-upon actions was a Citizen's Water Law Seminar. In the West, the Prior Appropriation law, which is based on the idea that water is a private property right, has evolved into a complex and often mystifying tangle of rules. Additionally, water quality, in-stream flows, and recreation issues complicate the understanding of water law. Many of our community leaders (county commissioners, planning and zoning boards, etc.), several of whom are new to Colorado, admitted to little understanding of the law, yet recognized its importance in their work.

The Council agreed that it did not matter which side of a water issue anyone represents — agriculture, development, environmental, recreation — the law is the law, and the more citizens that understand the water law, the better.

In brief, the seminar was held and was a wonderful success. It was planned in three months, was low-budget, gave the Council strong local credibility, and provided an early success upon which to tackle tougher issues.

For more information:
Jeff Keidel, Coordinator, Upper Arkansas Watershed Council, P.O. Box 938, Buena Vista, Colorado 81211, 719-395-6035.

Key Contacts and Resources

SUCCESS STORIES AND NATIONAL PROJECT SUMMARIES

- **Blue Thumb - An Urban Watershed Success Story,** Susan Gray, Extension Horticulture/Water Quality Agent, Michael Smolen, Water Quality Coordinator Oklahoma Cooperative Extension Service, Cheryl Cheadle, District Manager, Tulsa County Conservation District, Laura Pollard, District Manager, Oklahoma County Conservation District, Jennifer Myers, Blue Thumb Coordinator, John, Water, Quality Programs Coordinator, Oklahoma Conservation Commission, paper presented at Watershed '96, http://www.epa.gov/OWOW/watershed/Proceed/gray.html
- **Global Rivers Environmental Education Network (GREEN) Success Stories,** http://www.igc.apc.org/green/success.html, people learn a lot by sharing stories and this is a site designed to provide an opportunity users to share stories about successful efforts their organization, school or community has made to research, educate about, or improve their local watershed — and to see what others have done.
- **Section 319 Nonpoint Source Success Stories,** http://www.epa.gov/OWOW/NPS/Success319/, Section 319 Nonpoint Source Success Stories demonstrates the successful implementation of the Section 319 Clean Water Act Nonpoint Source program. The report provides examples of successful solutions to a variety of water quality problems caused by nonpoint source pollution. Contact: Amy Gambrill, 202-260-7105, US EPA, 401 M Street, S.W. 4503F, Washington, DC, 20460
- **The Watershed Sourcebook: Watershed-Based Solutions to Natural Resource Problems,** University of Colorado School of Law, Natural Resources Law Center, Campus Box 401, Boulder, Colorado, 80309-0401, Doug Kenney, 303-492-1288, 303-492-1297 (fax), Douglas.Kenney@Colorado.EDU, concise case studies of 76 watershed initiatives in the western United States. Center is also examining the state and federal roles in supporting watershed groups.
- **The Watershed Protection Approach: 1993/4 Activity Report,** EPA840-S-94-001, November 1994, http://www.epa.gov/OWOW/watershed/watershd93-94-Activity.html, describes over 120 projects where EPA was a partner in implementing the watershed approach. Call 1-800-490-9198 for a free copy.

LOCAL EXAMPLES

- **"How the McKenzie Watershed Council Got Started,"** May 1995, describes the story of the formation of the council and provides advice to others. Lane Council of Governments, 125 E. 8th Avenue, Eugene, OR 97401, 503-687-4283
- **California Coast and Ocean,** Volume 8, Numbers 3&4, Fall 1992, pages 8-20 discuss Morro Bay, Carol Arnold, Program Manager, 1330 Broadway, 11th Floor, Oakland, CA 94612-2530, 510-286-4173, 510-286-0470 (fax), carola@igc.org.
- **Water Works: Your Neighbors Share Ideas on Working in Partnership for Clean Water,** Tennessee Valley Authority, March 1997. Useful guide. Kathleen O'Brien, editor, 423-632-8502, 423-632-3188 (fax). See stories of Marlene Fields and Milt Jackson.

APPENDIX
Tips from Practitioners

Know Your Watershed's Top 10 Hint List

(see Lesson #6, Know Your Watershed)

(1) Include All With a Stake

(2) Think Large, Work Local

(3) Ask Not "Do You Like It?" But "Can You Live With It?"

(4) Respect the Four Stages of Building Partnerships (Forming, Storming, Norming, Performing)

(5) Just Do It

(6) Celebrate Early Successes

(7) Clear, Measurable Goals Must Be Locally-Driven

(8) Ask for In-Kind Services

(9) When Stuck, Ask Seven Times "Why?"

(10) Focus on the End, Not the Process

Reed Holderman's Lessons Learned

(California Coastal Conservancy, 510-286-1015 - see Lesson # 10, Santa Ynez Watershed)

(1) Be sure that a watershed planning process is needed and if it is, build community support for it before proceeding.

(2) Invite everyone into the process and ask political leaders to select the steering committee. Otherwise, people will ask: who appointed you?

(3) Don't be presumptuous. On the Santa Ynez River, we assumed everybody would appreciate a well thought out scope of work, budget, and schedule. WRONG! They said it only proved that the whole thing was a set-up. Do yourself a favor, next time, let them figure it out!

(4) When the majority of stakeholders tell you that they want to deal with their issue first, believe them. I remain convinced that our failure to sustain interest in the Santa Ynez River plan was primarily because we were not willing to assist the County in carrying out its proposed channel clearing activities in the Lompoc valley as a separate and distinct project.

(5) Do whatever you can to break down barriers and perceptions people have of each other. Be creative. Family BBQs, soft-ball games, and parties have done wonders to improve relationships among stakeholders and build trust.

(6) Maintain constant communication among stakeholders throughout the process and especially in the beginning to pass information along, answer questions, or deal with rumors. Whether it's through regular meetings, newsletters, web sites, phone trees, or all four, good communication is a must.

(7) And finally, line up your money and in-kind services in advance of starting your watershed project or else two bad things will happen: (a) your stakeholders will buy into a process and scope of work only to find out they can't afford it; and (b) you will spend more time looking for cash than participating in the planning process. Either way, you lose.

Swift River Principles

Contact Pat Munoz, River Network (see Lesson #7 - Key Contacts and Resources) or Kevin Coyle, National Environmental Education and Training Foundation (see Lesson #9 - Key Contacts and Resources).

(1) Include a mixture of top-down and bottom up strategies.

(2) Encourage consensus approaches, not bomb-throwing.

(3) "Reinvent" ways to conserve resources.

(4) A one size fits all "cookie-cutter" approach will not work.

(5) Involve key "stakeholders."

(6) Focus on individuals and work on "retail" approaches.

(7) Be creative about who foots the bill.

(8) Take advantage of emerging science - but don't expect it to be perfect.

(9) Remember the need for watershed education.

(10) It's about brokerage and gap filling.

Dennis Hall's Observations from Darby Creek, OH

(see Lesson #2 - Key Contacts and Resources)

(1) How to fail in watershed management: demonstrate disrespect for watershed residents and the natural resource.

(2) Promote "learning" and "understanding" as opposed to "educating." Do not assume that people will protect the stream if "educated." Consider canoe trips or other creative educational settings to help clientele understand the watershed issues.

(3) Recruit opinion leaders from the community, especially if they have challenging points of view. Sometimes these individuals are not in the local leadership positions, but have a lot of credibility with neighbors and friends.

(4) Consider fear and pride as sources of motivation. Fear of regulation may bring some audiences to the table, but pride will generate longer lasting protection.

(5) Work towards creating common ground and win/win outcomes. Consider competitiveness, environmental soundness, and social/political issues.

(6) Clarify areas of conflict. View conflict as an opportunity to learn.

(7) Promote the positive. Beware the double negative. We learned it was important to show that farmers are "doing good things" to protect Big Darby Creek, instead of "not doing bad things."

(8) In community development, fast is slow and slow is fast. Take time to grow slowly.

(9) Value resistance for there is much to understand.

APPENDIX
Questions and Answers

QUESTION: Do you know any examples of where GIS has been used to educate municipal officials about nonpoint source pollution and impervious surfaces? (See Lesson #7)

ANSWER: Chester Arnold, University of Connecticut Cooperative Extension Service.

QUESTION: What curricula are out there for watersheds and which is the best? (See Lesson #9)

ANSWER: There are many curricula and activity guides related to watersheds. There's the Water Education for Teachers curriculum produced by Project WET; there's a Watershed Sourcebook developed by Global Rivers Environmental Education Network; and there are activity and leader guides developed by University of Wisconsin. There's also an Adopt-A-Watershed curriculum guide. Each has its special emphasis. Elaine Andrews at the University of Wisconsin reviewed most water curricula and she's a good contact; her summary is on the web at www.uwex.edu/erc/ywc /sumlist.htm.

QUESTION: What's River Network and how does it relate to the Know Your Watershed? (See Lesson #7 - Key Contacts and Resources)

ANSWER: River Network and Know Your Watershed both support the development and growth of watershed groups. Both have great web sites and starter kits for groups.

QUESTION: Where has a watershed coordinator made a difference? (See Lesson #3)

ANSWER: Many herald the work of Mike Adcock in the Tensas River Watershed as exemplary.

QUESTION: What comprehensive analysis exist of watershed efforts in the West? (See Introduction - Key Contacts and Resources)

ANSWER: The University of Colorado - Boulder conducted a review of watershed groups in the west. Doug Kenney is the contact. His e-mail is Douglas.Kenney@Colorado.EDU

QUESTION: How can I get the Watershed '96 Proceedings? When is the next big Watershed Conference?

ANSWER: The Watershed '96 Proceedings are up and searchable on the internet off www.epa.gov/owow. While there are many "regional" and "technical" watershed conferences being planned, the agencies that co-sponsored Watershed '96 have not made plans for a similar conference as of the date of this publication. Contact Janet Pawlukiewicz, EPA, for latest developments, 202-260-9194.

QUESTION: What watershed groups have succeeded in implementing their plans? (See Lesson #5)

ANSWER: Cedar River Watershed in Washington has come a long way in implementing its vision of purchasing high priority areas in the watershed. The McKenzie Watershed Council has developed an innovative approach to monitoring its waters and has done a lot in the Mohawk subwatershed.

QUESTION: My watershed is considering setting up a nonprofit to help my watershed effort along. What resources are available to help us? Who else has experience doing this?

ANSWER: The National Estuary Program developed guidance on using nonprofits to advance estuary program goals (see Lesson #6 Key Contacts and Resources). Morro Bay has experience setting up a nonprofit (see Lesson #10) as do the Rathbun and the China Lake Watershed Alliances (see Lesson #6 - Key Contacts and Resources).

QUESTION: Where is an example of where pollution control measures alone were not enough?

ANSWER: The Waukegan River Watershed Project, a national monitoring project under section 319, has data that indicates fish did not return until the pool riffle system was established. Contact is Rick Mollahan 217-782-3362.

QUESTION: Where have volunteers monitors made a difference?

ANSWER: GREEN students uncovered a malfunctioning pump in Detroit and worked to correct it (See Lesson #9). In addition, in the Brazos River Watershed, Texas, volunteer monitors helped get industry to help protect the watershed (See Lesson #8).

QUESTION: The stakeholders in my watershed have a deep history of mistrust and are having a hard time coming to consensus. How can I get the ball rolling?

ANSWER: The Upper Arkansas Watershed in Colorado had a deep history of conflict and mistrust and started with a citizen water seminar which worked well for them (see Lesson #10).

QUESTION: What resources are available on the web for watersheds? (See Appendix 4)

ANSWER: There are many resources on the web for watershed groups. There's a technical chat area on the Water Environment Federation's site. EPA has a site called "Surf Your Watershed" where citizens and managers can locate their watershed and discover its condition and the partners working to protect it. Izaak Walton League has a popular macro invertebrate stream indicator site. A listing of the key URLs is provided in the back of this document (see Appendix #4).

QUESTION: What are some good tools for watershed groups?

ANSWER: While EPA does not "endorse" products, we have do realize that there are many tools that watershed groups find particularly useful. See Lessons #7 and #9 (Key Contacts and Resources List) for a good starting point. A few tools that practitioners seem to like include the Community Visioning video (see Lesson #1 - Key Contacts and Resources) and the table-top Enviroscape model produced by Terrene, which many states own and watershed groups can borrow. In addition, several practitioners have said they have found the River Network's Starting Up guide to be very useful in establishing a group - setting up by-laws and obtaining grants (see Lesson #7).

QUESTION: Where is a broad-based partnership being used to protect drinking water sources?

ANSWER: The Mark Twain Water Quality Initiative in Missouri is a very broad-based alliance that is working to protect a lake that is threatened by agri-chemicals, nutrients, and sediment. Ray C. Archuleta is the contact. In addition, the Rathbun alliance is working to protect a rural water supply (See Lesson #6 - Key Contacts and Resources).

APPENDIX
Water-Related News Bulletins

Cities International Newsletter

http://www.icma.org/cities/index.html
circulation and frequency: quarterly
focus: information related to local government (Note: not just water)
target audience: local government managers
editor: Editor, Cities International Newsletter, 1-800-745-8780, 301-206-9789 (fax)

Coastlines

http://www.epa.gov/owow/estuaries/coastlines/coastlines.html
circulation and frequency: 4,000/quarterly
focus: coasts, estuaries
target audience: coastal water managers
editor: Samantha Woods, Horsley Witten, P.O. Box 7, 3179 Main Street, Barnstable, MA, 02630, 508-362-5570

Focus

http://www.ctic.purdue.edu/KYW/Focus.html
circulation and frequency: monthly
focus: watershed outreach tools and technical resources
target audience: watershed partnership groups
editor: Focus Editor, Know Your Watershed, 1220 Potter Drive, Room 170, West Lafayette, IN, 47906, 765-494-9555, kyw@ctic.purdue.edu

LakeLine

circulation and frequency: quarterly/2000+
focus: lake management issues
target audience: lake managers and lake leaders/residents
editor: Jeffrey Thornton, 414-547-6721, International Environmental Management Services, 321 Barney Street, Waukesha, WI 53186-2402, iems@aol.com, or lakeline@nalms.org.
or c/o Barbara Timmel, Administrative Assistant, North American Lake Management Society (NALMS), P.O. Box 5443, Madison, WI, 53705-5443, 608-233-2836, 608-233-3186 (fax).

Nonpoint Source News-Notes

http://www.epa.gov/owow/info/NewsNotes/
circulation and frequency: 14,000/quarterly
focus: nonpoint source and watershed issues target audience: local, state, and national water managers
editor: Elaine Bloom, Tetra Tech, 10306 Eaton Place, Suite 340, Fairfax, VA, 22031, 703-385-6000.

Our World

circulation and frequency: 5 times a year/ 2,000+
focus: to educate parents on environmental issues and children
target audience: PTA members (Parents)
editor: Ed Stermer, 330 North Wabash Avenue, Suite 2100, Chicago, IL, 60611, 312-670-6782 x361, 312-670-6783 (fax), e_stermer@pta.org

River Voices

http://www.teleport.com/~rivernet/rivernet/pubs.htm
circulation and frequency: quarterly
focus: river conservation and organization-building
target audience: river activists
editor: Editor, River Voices, River Network, PO Box 8787, Portland, OR 97207-8787, 1-800-423-6747 Fax: 503-241-9256

Swampthings

http://www.epa.gov/owow/info/swamp/
circulation and frequency: 800/monthly
focus: wetland issues
target audience: wetland managers
editor: Stephanie Peters, EPA, 401 M St., 4502F, Washington, D.C. 20460, 202-260-7946

Volunteer Monitor

http://www.epa.gov/owow/monitoring/volunteer/vm_index.html
circulation and frequency: 10,000+/ twice a year
focus: watershed monitoring by volunteers
target audience: volunteer environmental monitoring groups across the nation
editor: Eleanor Ely, Editor, The Volunteer Monitor, 1318 Masonic Avenue, San Francisco, CA 94117, 415-255-8049

Water Monitor

http://www.epa.gov/owow/watermonitor/
circulation and frequency: 2,500/bimonthly
focus: water monitoring activities
target audience: State, EPA headquarters and regions, and concerned citizens
editor: Alice Mayio, EPA, 401 M St., S.W., 4503F, Washington, D.C. 202-260-7018, mayio.alice@epamail.epa.gov

Watershed Events

http://www.epa.gov/owow/info/WaterEventsNews/
circulation and frequency: 5,000/quarterly
focus: watershed issues
target audience: watershed managers and those who support them
editor: John McShane, EPA, 401 M St., 4501F, Washington, D.C. 20460, 202-260-0409, mcshane.john@epamail.epa.gov

Watershed News

circulation and frequency: periodic
focus: watershed issues
target audience: watershed practitioners
editor: John Peterson, Watershed Programs Specialist, NACD, 9150, West Jewell Ave., Suite 102, Lakewood, CO, 80232-6469, 703-455-4387

Watershed Protection Techniques

http://www.pipeline.com/~mrrunoff/
circulation and frequency: periodic
focus: watershed restoration and protection tools
target audience: watershed practitioners
editor: Center for Watershed Protection, 8737 Colesville Road, Suite L-105, Silver Spring, MD 20910, 301-589-1890, 301-589-8745 (fax), Thomas Schueler, Editor-in-Chief and June Beittel, Managing Editor

APPENDIX

Index to Terms and Organizations

Index to Individuals

APPENDIX
Index to Terms and Organizations
(continued)

Index to Guides and Resources

Internet Sites

Adopt-A-Watershed:
http://www.tcoe.trinity.k12.ca.us/aaw/

American Rivers:
http://www.amrivers.org/

Anacostia Watershed Society:
http://www.anacostiaws.org

Center for Excellence for Sustainable Development:
http://www.sustainable.doe.gov/index.html

Center for Watershed Protection:
http://www.pipeline.com/~mrrunoff/

Chesapeake Bay:
http://www.epa.gov/r3chespk/

EPA:
http://www.epa.gov/owow

Farm-A-Syst:
www.wisc.edu/farmasyst

Freshwater Imperative:
http://www.islandpress.com/books/bookdata/FWimp.html

GREEN:
http://www.econet.apc.org/green/

Groundwater Foundation:
www.groundwater.org

Izaak Walton League:
http://www.iwla.org

Know Your Watershed:
http://ctic.purdue.edu/KYW/KYW.html

National Fish and Wildlife Organization:
http://www.nfwf.org

The Nature Conservancy:
www.tnc.org

Planners Web:
http://www.planning.org/books/bookstor.html

Project WET:
http://www.montana.edu:80/wwwwet/

River Network:
http://www.teleport.com/~rivernet/rivernet/leader2.htm

Surf Your Watershed:
www.epa.gov/surf

Terrene Institute:
http://www.terrene.org/cfaward.htm

University of Connecticut:
www.lib.uconn.edu/CANR/ces/Nemo/

University of Wisconsin:
http://www.uwex.edu/erc

Water Environment Federation:
http://www.wef.org/wwwboard/watershed/wwwboard.html

Watershed '96 On-Line Proceedings:
http://www.epa.gov/OWOW/watershed/Proceed/

Western Governor's Association:
http://www.westgov.org

Wildlife Habitat Council:
http://www.wildlifehc.org/index.html

APPENDIX
Advisor E-mail List

Many Thanks to the Following Key Network Contacts

Diana Allen,
Lower South Platte River Natural Resource District
dallen@nrdec.nrc.state.ne.us

Elaine Andrews,
University of Wisconsin Cooperative Extension
erc@uwex.edu

Chester Arnold,
University of Connecticut Cooperative Extension
carnold@canr1.cag.uconn.edu

Lorna Baldwin,
Watershed Planner, East Lane Soil and Water Conservation District lbaldwin@efn.org

Bob Ball, NRCS,
Columbia, MO
bobb@mo.nrcs.usda.gov

Dave Bassage,
Friends of the Cheat, West Virginia
dbassage@access.mountain.net

Jennifer Boyle,
National Council of Farmer Cooperatives
jboyle@ncfc.org

Dennis Bowker,
Napa County Conservation District
102223.2012@compuserv.com

Susan Branning,
U.S. EPA Region 6
branning.susan@epamail.epa.gov

Tom Coney,
Brazos River Authority, Texas
tomco@brazos.org

Alison Cook,
River Network
cookalison@aol.com

Jessica Cogan,
U.S. EPA National Estuary Program
cogan.jessica@epamail.epa.gov

Jill Davies,
Elk Creek Watershed, MT
nox2228@montana.com

Karen Firehock,
National Save Our Streams
kfirehoc@iwla.org

Abby Friedman,
National Association of Counties
afriedma@naco.org

Trish Garrigan,
U.S. EPA Region 1
garrigan.trish@epamail.epa.gov

Dennis Hall,
Big Darby Watershed, OSU Cooperative Extension
hall.16@osu.edu

Richard Hall,
Maryland Office of Planning
Rich@mail.mop.md.gov

Karen Hamilton,
U.S. EPA Region 8
hamilton.karen@epamail.epa.gov

John Hassell,
Oklahoma Conservation Commission
jhassell@occwq.state.ok.us

Reed Holderman,
California Coastal Conservancy
rholderman@igc.org

Ginger Howell,
U.S. EPA National Estuary Program
howell.ginger@epamail.epa.gov

Doug Kenney,
University of Colorado
Douglas.Kenney@Colorado.EDU

Karol Keppy,
Know Your Watershed
keppy@ctic.purdue.edu

Karen Klima,
U.S. EPA Surf Your Watershed
klima.karen@epamail.epa.gov

Kathy Luscher,
River Network
rivernet@igc.apc.org

Larry Martick,
Adams County Conservation District
adams.conservation@a1.dep.state.pa.45

Greg McNelly,
Water Environment Federation
gmcnelly@wef.org

Kathy Minsch,
Puget Sound Water Quality Action Team
kmins@aol.com

Larry Morandi,
National Conference of State Legislatures
larry.morandi@ncsl.org

Pat Munoz,
River Network
patmunoz@aol.com

Robert Nuzum,
East Bay Municipal Utility District
nuzum@ebmud.com

Kathy O'Brien,
Tennessee Valley Authority
kgobrien@tva.gov

Michael Pawlukiewicz,
Urban Land Institute
michaelp@uli.org

Larry Price,
Global Rivers Environmental Education Network
lprice@green.org

Anne Rheams,
Save Our Lake, Lake Pontchartrain Basin Foundation
lpbfeduc@communique.net

David Schmidt,
Global Rivers Environmental Education Network
dschmidt@green.org

Susan Seacrest,
The Groundwater Foundation
info@groundwater.org

Audrey Shileikis,
U.S. EPA Region 9
shileikis.audrey@epamail.epa.gov

Dwight Siemiaczko,
Lower Paint Creek Watershed, West Virginia
5pole@citynet.net

Judy Taggart,
Terrene Institute
terrene@gnn.com

Lauren Wenzel,
Maryland Department of Natural Resources
LWENZEL@dnr.state.md.us

Jean White,
Cedar River Watershed Council, Washington
jean.white@metrokc.gov

Kathi Wiederhold,
Lane Council of Governments
kwiederhold@lane.cog.or.us

Barbara Yuhas,
International City/County Managers Association
byuhas@icma.org

and many others without e-mail...

APPENDIX

Feedback on Top 10 Watershed Lessons Learned

Please provide your feedback on this product.

Please complete this sheet or visit our web site at http://www.epa.gov/owow and simply leave a comment (indicate it is on this product). Thanks.

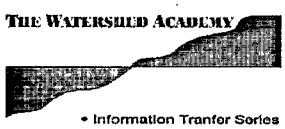
Send to Ben Ficks, US EPA, 401 M Street, S.W. 4501 F, Washington, D.C. 20460,
ficks.ben@epamail.epa.gov or 202-260-8652, x2529 (fax)

What did you find most useful about this document?

What did you find least useful or missing in this document?

Overall rating? (circle) 1 (lowest) 2 3 4 5 (highest)

Other comments:



www.epa.gov/owow/lessons